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PREFACE.

In preparing this volume on "Cattle," the author has often had reason to deplore the want of materials, and which he has been enabled to obtain only by correspondence with competent individuals, and the personal inspection of the present state of cattle, in the greater part of the British empire. To those noblemen and agriculturists from whom he derived information, the more highly estimated by him, because most readily and courteously granted, he begs to return his warmest thanks. His obligation to Mr. Berry, for the admirable history of the Short-Horns, will not be soon forgotten.

He has endeavoured to lay before the public an accurate and faithful account of the cattle of Great Britain and Ireland. He does not expect to please every one who reads his work or who has contributed towards it; for long experience has taught him that, although there is some excellence peculiar to each breed, there is none exempt from defect; and the honest statement of this defect will not satisfy the partisan of any one breed, or or of any variety of that breed. He has passed lightly over the subject of the general management of cattle, in order to avoid trenching on the work on "British Husbandry," now publishing under the superintendence of the Society.

The diseases of cattle was a favourite topic with the writer, but here, too, he painfully felt the deficiency of materials for a treatise worthy of such a subject. One branch of veterinary science has rapidly advanced. The diseases of the horse are better understood and better treated; but, owing to the absence of efficient instruction concerning the diseases of cattle in the principal veterinary school, and the incomprehensible supineness of agricultural societies, and agriculturists generally, cattle have been too much left to the tender mercies of those who are utterly ignorant of their structure, the true nature of their diseases, the scientific treatment of them, and even the very first principles of medicine.

With the few practitioners scattered through the country, who had praiseworthily devoted themselves to the study of the maladies of cattle, the author entered into correspondence; and he derived from them a liberal assistance which does honour to the profession whose character they are establishing.

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To many of the contributors to that valuable periodical, "The Veterinarian," he is under considerable obligation, which has been duly and gratefully acknowledged. He has likewise had recourse to various foreign authorities; for, although far behind us in the cultivation of the breed of cattle, many continental writers, and continental agriculturists generally, have set us a laudable example of attention to the diseases of these animals.

The author ventures to hope that the information derived from these sources, as well as from his own practice, may have enabled him to lay before his readers a treatise on "Cattle" not altogether unsatisfactory; and that, particularly with regard to the maladies of the ox, so often grossly misunderstood and shamefully treated, he may have succeeded in laying down some principles which will guide the farmer and the practitioner through many a case heretofore perplexing and almost uniformly fatal. At all events, he will have laid the foundation for a better work, when common sense, and a regard to the best interests of husbandry, shall have induced agriculturists to encourage, or rather to demand a higher degree of general education in veterinary practitioners, and shall have founded, south of the Tweed, those schools for professional instruction in every branch of the veterinary art which have been successfully established, and are honourably considered on the continent.

W. YOUATT.

Nassau Street, Middlesex Hospital,
London.

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CATTLE.

INTRODUCTION.

If this volume of 'The Farmers' Series' is devoted to the history, general management, and medical treatment of an animal less connected with our commerce and our pleasure, and less endowed with intelligence and courage, and many a noble quality, than 'the horse,' we shall yet find in 'cattle,' a subject more identified with our agricultural prosperity, and with the comforts, and the very continuance of life. If an ox is not individually so valuable as a horse, yet, in the aggregate, cattle constitute a much greater proportion of the wealth of the country; for although Great Britain contains a million and a half of horses, she has to boast of more than eight millions of cattle, unrivalled in the world.

One hundred and sixty thousand head of cattle are annually sold in Smithfield alone, without including calves, or the *dead-market*—the carcases sent up from various parts of the country. If we reckon this to be a tenth part of the cattle slaughtered in the United Kingdom, it follows that 1,600,000 cattle are sent to the butcher every year; and, averaging the life of the ox or the cow at five years, the value of British cattle, estimated at 10*l*. per head, will be eighty millions sterling. 1,200,000 sheep, 36,000 pigs, and 18,000 calves, are also sent to Smithfield in the course of a year, and if we reckon these to be a tenth of the whole number, and allow only two years as the average duration of the lives of sheep and pigs, and value the calves at 2*l*. 10*s*. each, the pigs at 2*l*., and the sheep at 1*l*. 10*s*., we shall arrive at the additional sum of nearly forty millions; so that we may safely compute the actual value of cattle, sheep, and swine, to be nearly 120 millions sterling.

Although much has been done by agricultural societies to improve the breed and the general treatment of these animals, and much valuable instruction is to be found scattered in many a volume, no one has yet attempted to collect these fragments of 'useful knowledge,' and to add to them his own experience; and in one very important part of our subject, there has been the most unaccountable neglect, for there is scarcely in the English language a work on the preservation of the health, and the prevention and cure of the diseases, of cattle and sheep, on which any dependence can be placed. Although a tenth part of the sheep and lambs die annually of disease, (more than four millions perished by the rot alone in the winter of 1829–30,) and at least a fifteenth part of the neat cattle are destroyed by inflammatory fever and milk fever, red water, hoose, and diarrhœa; and the country incurs a loss of nearly ten millions of pounds annually, the agriculturist knows not where to go for information on the nature and the cure of the maladies of which they die; and is either driven to confide in the boasted skill of the ignorant pretender, or make up his mind that it is in vain to struggle against the evils which he cannot arrest, and lets matters take their course.

There are two great sources of the mortality of cattle and sheep, and the loss of agricultural property, and it is difficult to say which is the worst, the ignorance and obstinacy of the servant and the cowleach, or the ignorance and supineness of the owner.

Veterinary schools, that owed their origin to the ravages of epidemics among cattle, and that were established for the express purpose of teaching 'a more systematic knowledge of the management of sheep and cows,' have shamefully neglected their trust. The horse has gradually absorbed the whole of their attention; he alone has been heard of in the lectures and practice of these schools; and, until within a very few years, the best veterinary practitioner was uneducated and uninformed in matters relating to cattle.

A great deal has been written in different books respecting the peculiarities of the different breeds, and their adaptation to different purposes, and the points which may be said to be characteristic of each, and on which their excellence mainly depends: but the opinions of the writers are often too much at variance with each other; and the farmer too frequently rises from the perusal of them puzzled rather than instructed, and even led astray from his interest instead of being guided in its pursuit.

The subject of the present work will be the Natural History, the different Breeds, the Structure, (more particularly with reference to their beauties and defects,) the utility for various purposes, and the Diseases, and General Management of Cattle, with their most rational and successful treatment; and if we may be enabled to rouse the farmer to strive, and perhaps successfully strive, to rescue a few of his oxen from that destruction of which he has been an almost passive spectator; and to direct his attention—the attention of the little farmer, and the cottager, as well as the wealthier and more influential individual—to that which should not have been so long and so utterly neglected, our main and most valuable purpose will be accomplished.

CHAPTER I.

THE NATURAL HISTORY OF THE OX.

The Ox belongs to the CLASS *mammalia*, animals having mammæ, or teats; (see 'The Horse, p. 62,) the ORDER *ruminantia*, ruminating, or chewing their food a second time; the TRIBE *bovidæ*, the ox kind; the GENUS *bos*, the ox, the horns occupying the crest, projecting at first sideways, and being porous or cellular within; and the SUB-GENUS *bos taurus*, or the domestic ox.

Distinguished according to their teeth, they have eight *incisors*, or cutting teeth, in the lower jaw, and none in the upper. They have no tusks, but they have six *molars*, or grinding teeth, in each jaw, and on each side.

The whole would, therefore, be represented as follows:—(see 'The Horse,' p. 63):—

The ox, incisors $\frac{0}{6}$, canines $\frac{0}{0}$, molars $\frac{6}{6}$-$\frac{6}{6}$. Total, 30 teeth.

The native country of the ox, reckoning from the time of the flood, was the plains of Ararat, and he was a domesticated animal when he issued from the ark. He was found wherever the sons of Noah migrated, for he was necessary to the existence of man; and even to the present day, wherever man has trodden, he is found in a domesticated or wild state. The earliest record we have of the ox is in the sacred volume. We are told that, even in the antediluvian age, and soon after the expulsion from Eden, the sheep had become the servant of man; and the inference is not improbable, that the no less useful ox was subjugated at the same time. It is recorded, that Jubal, the son of Lamech, and who was probably born during the life-time of Adam, was the father of such as dwell in tents, and of such as have cattle.*

Being domesticated before the flood, the ox would not be neglected by Noah and his sons afterwards; and as the families of men spread abroad after the confusion of tongues, the ox would be carried with them, as constituting one of the most valuable portions of their wealth. When Abraham was in Egypt,† one hundred and eighty years before there is any mention of the horse, Pharaoh presented him with sheep and oxen.

The records of profane history confirm this account of the early domestication and acknowledged value of this animal, for it was worshipped by the Egyptians, and venerated among the Indians. The Indian legends say that it was 'the first animal that was created by the three kinds of gods, who were directed by the Supreme Lord to furnish the earth with animated beings.' The traditions of every Celtic nation enrol the cow among the earliest productions, and represent it as a kind of divinity.

The parent race of the ox is said to have been much larger than any of the present varieties. The Urus, in his wild state at least, was an enormous and fierce animal, and ancient legends have thrown around him an air of mystery. In almost every part of the Continent, and in every district of England, skulls, evidently belonging to cattle, have been found, far exceeding in bulk any now known. There is a fine specimen in the British Museum: the peculiarity of the horns will be observed, resembling smaller ones dug up in the mines of Cornwall, preserved in some degree in the wild cattle of Chillingham Park, and not quite lost in our native breeds of Devon and East Sussex, and those of the Welsh mountains and the Highlands. The combat of Guy, Earl of Warwick, with the dun cow, the skull of which is yet preserved in the castle of Warwick, will sufficiently prove the comparatively large size of some of the wild cattle of that day. We have reason, however, to believe that this referred more to individuals than to the character of the breed generally, for there is no doubt that, within the last century, the size of the cattle has progressively increased in England, and kept pace with the improvement of agriculture.

We will not endeavour to follow the migrations of the ox from Western Asia, nor the change in size, and form, and value, which it underwent, according to the difference of climate and of pasture, as it journeyed on towards the west, for there are no records of this on which dependence can be placed; (the historians of early days were poor naturalists;) but we will proceed to the subject of the present work, the British Ox.

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* Gen. iv. 20.

† Gen. xii. 16.

CHAPTER II.

THE BRITISH OX.

In the earliest and most authentic account that we possess of the British Isles, the Commentaries of Cæsar, we learn that the Britons possessed great numbers of cattle; that they comparatively neglected the plough, and lived on the flesh and the milk of these animals. The fondness for this kind of food, on account of which foreigners sometimes attempt to ridicule the Englishman, is inherited from ancestors of the remotest date. No satisfactory description of these cattle occurs in any ancient author; but they would seem, with occasional exceptions, to have possessed no great bulk or beauty. The poets have celebrated the intelligence, or fidelity, or some interesting quality of almost every species of agricultural property but the heavy and seemingly stupid ox—not so uninteresting, however, as many have imagined him to be, when he is closely observed, and his habits and capabilities watched.

Cattle are like most other animals, the creatures of education and circumstances. We educate them to give us milk, and to acquire flesh and fat. There is not much intelligence required for these purposes. It fares with the ox, as with all our other domesticated dependents, that when he has lost the wild freedom of the forest, and become the slave of man, without acquiring the privilege of being his friend, or receiving instruction from him, instinct languishes, without being replaced by the semblance of reason. But when we press him into our immediate service—when he draws our cart and ploughs our land—he rapidly improves upon us; he is, in fact, altogether a different animal: when he receives a kind of culture at our hands, he seems to be enlightened with a ray of human reason, and warmed with a degree of human affection. The Lancashire and the Devonshire ox seem not to belong to the same genus. The one has just wit enough to find his way to and from his pasture; the other rivals the horse in activity and docility, and often fairly beats him out of the field in stoutness and honesty in work. He is as easily broken in, and he equals him in attachment and gratitude to his feeder.

It is, however, in other countries where the services of the ox are more extensive, and his education more complete, that we are to look for that development of intellect, which his sluggish nature would scarcely promise here. Burchell, in the 1st vol. of his Travels into the Interior of Africa, p. 128, says:—

'These oxen are generally broken in for riding, when they are not more than a year old. The first ceremony, is that of piercing their nose to receive the bridle; for which purpose they are thrown on their back, and a slit is made through the septum, or cartilage between the nostrils, large enough to admit a finger. In this hole is thrust a strong stick stripped of its bark, and having at one end a forked bunch to prevent it passing through. To each end of it is fastened a thong of hide, of a length sufficient to reach round the neck and form the reins; and a sheep skin, with the wool on, placed across the back, together with another folded up, and bound on with a rein long enough to pass several times round the body, constitutes the saddle. To this is sometimes added a pair of stirrups, consisting only of a thong with a loop at each end slung across the saddle. Frequently the loops are distended by a piece of wood to form an easier rest for the foot. While the animal's nose is still sore, it is mounted and put in training, and in a week or two is generally rendered sufficiently obedient to its rider. The facility and adroitness with which the Hottentots manage the ox has often excited my admiration: it is made to walk, trot, or gallop, at the will of its master; and being longer-legged and rather more lightly made than the ox in England, travels with greater ease and expedition, walking three or four miles in an hour, trotting five, and galloping on an emergency seven or eight.'

Major Denham, in his Travels into Central Africa, gives the following amusing account of some of these excursions:—

'The beasts of burden used by the inhabitants, are the bullock and the ass. A very fine breed of the latter are found in the Mandara valleys. Strangers and chiefs in the service of the sheikh or sultan alone possess camels. The bullock is the bearer of all the grain and other articles to and from the markets. A small saddle of plaited rushes is laid on him, when sacks made of goat skins, and filled with corn, are lashed on his broad and able back. A leather thong is passed through the cartilage of his nose, and serves as a bridle, while on the top of the load is mounted the owner, his wife, or his slave. Sometimes the daughter or the wife of a rich Shouaa will be mounted on her particular bullock, and precede the loaded animals, extravagantly adorned with amber, silver rings, coral, and all sorts of finery; her hair streaming with fat, a black rim of kohal, at least an inch wide, round each of her eyes, and I may say arrayed for conquest at the crowded market. Carpet or robes are then spread on her clumsy palfry—she sits *jambe de ça, jambe de là*—and with considerable grace guides her animal by the nose. Notwithstanding the peaceableness of his nature, her vanity still enables her to torture him into something like caperings and curvetings.'

It is, however, in the southern part of Africa that the triumph of the ox is complete. His intelligence seems to exceed any thing that we have seen of the horse, and he is but little inferior to that most sagacious of all quadrupeds, the dog. Among the Hottentots these animals are their domestics, and the companions of their pleasures and fatigues; they are both the protectors and the servants of the Caffre, and assist him in attending his flocks, and guarding them against every invader. While the sheep are grazing, the faithful *backely*, as this kind of oxen is called, stands and grazes beside them. Still attentive, however, to the looks of its master, the *backely* flies round the field, obliges the herds of sheep that are straying to keep within proper limits, and shows no mercy to robbers, who attempt to plunder, nor even to strangers; but it is not the plunderers of the flock alone, but even the enemies of the nation, that these *backelies* are taught to combat. Every army of Hottentots is furnished with a proper herd of these creatures, which are let loose against the enemy. Being thus sent forward, they overturn all before them; they strike down with their horns, and trample with their feet, every one who attempts to oppose them, and thus often procure their masters an easy victory, before they have begun to strike a blow.

'An animal so serviceable is, as may be supposed, not without its reward. The *backely* lives in the same cottage with its master, and by long habit gains an affection for him; for in proportion as the man approaches to the brute, so the brute seems to attain even to the same share of human sagacity. The Hottentot and his *backely* thus mutually assist each other; and when the latter happens to die, a new one is chosen to succeed him, by a council of the old men of the village. The new *backely* is then joined with one of the veterans of his own kind, from whom he learns his art, becomes social and diligent, and is taken for life into human friendship and protection.'—*Illustrations of Natural History*, p. 88.

There is a well authenticated story of a Scotch bull, which shows similar, but not equal sagacity. 'A gentleman in Scotland, near Laggan, had a bull which grazed with the cows in the open meadows. As fences are scarcely known in that part, a boy was kept to watch, lest the cattle should trespass on the neighbouring fields, and destroy the corn. The boy was fat and drowsy, and was often found asleep; he was, of course, chastised whenever the cattle trespassed. Warned by this, he kept a long switch, and with it revenged himself with an unsparing hand, if they exceeded their boundary. The bull seemed to have observed with concern this consequence of their transgression, and as he had no horns, he used to strike the cows with his large forehead, and thus punish them severely, if any of them crossed the boundary. In the mean time he set them a good example himself, never once straying beyond the forbidden bounds, and placing himself before the cows in a threatening attitude if they approached them. At length his honesty and vigilance became so obvious, that the boy was employed in weeding, and other business, without fear of their misbehaviour in his absence.'—*Instinct Displayed*, Letter 34.

Captain Cochrane, in his Travels in Columbia, vol. ii. p. 251, places them in another, and not uninteresting point of view: 'I was suddenly aroused by a most terrific noise, a mixture of loud roarings and deep moans, which had the most appalling effect at so late an hour. I immediately went out, attended by the Indians, when I found close to the rancha, a large herd of bullocks collected from the surrounding country; they had encompassed the spot where a bullock had been killed in the morning, and they appeared to be in the greatest state of grief and rage: they roared, they moaned, they tore the ground with their feet, and bellowed the most hideous chorus that can be imagined, and it was with the greatest difficulty they could be driven away by men and dogs. Since then, I have observed the same scene by daylight, and seen large tears rolling down their cheeks. Is it instinct merely, or does something nearer to reason tell them by the blood, that one of their companions has been butchered? I certainly never again wish to view so painful a sight: they actually appeared to be reproaching us.

If cattle exhibit some of the good qualities of superior animals, or even of man himself, they likewise have some of his failings. Vanity forms as distinguishing an attribute of the female of this species, as of some others. The account of the Swiss cows is not a little amusing, although we believe that it is somewhat exaggerated.

'In the Swiss Canton of Appensell, pasturage being the chief employment of the inhabitants, the breeding of cattle, and the subsequent management of the dairy, are carried to the greatest perfection. The mountaineer lives with his cows in a perpetual exchange of reciprocal acts of kindness; the latter affording almost every requisite he needs, and in return they are provided for, and cherished by him, and sometimes more so than his own children. They are never ill treated nor beaten, for his voice is sufficient to guide and govern the whole herd, and there reigns a perfect cordiality between them.

'In the Alps, the fine cattle are the pride of their keepers, who adorn the best of them with an harmonious set of bells, chiming in accordance with the celebrated *ranz des vaches*. The finest black cow is adorned with the largest bell, and the two next in appearance wear smaller ones. Early in the spring, when they are removed to the Alps, or to some change of pasture, he dresses himself in all his finery, and proceeds along, singing the *ranz des vaches*, followed by three or four fine goats: next comes the finest cow adorned with the great bell, then the other two with the smaller bells, and these are succeeded by the rest of the cattle walking one after another, and having in their rear, the bull with a one-legged milking stool on his horns, while the procession is closed by a sledge bearing the dairy implements.

'It is surprising to see the pride and pleasure with which the cows stalk forth, when ornamented with their bells. One would hardly imagine that these animals are sensible of their rank, and affected by vanity and jealousy; and yet if the leading cow is deprived of her honours, she manifests her disgrace by lowing incessantly, and abstaining from food, and losing condition. The happy rival on whom this badge of superiority has devolved, becomes the object of her vengeance, and is butted, and wounded, and persecuted by her in the most furious manner, until she regains her bell, or is entirely removed from the herd.'—*Illustrations of Natural History*, p. 72.

Having thus somewhat vindicated the intellectual power and worth of the subject of our work, we return to the agricultural state of the country when the Romans invaded Britain. Cæsar tells us, that the Britons neglected tillage, and lived on milk and flesh; and other authors corroborate this account of the early inhabitants of the British Islands. It was that occupation and mode of life which suited their state of society. The island was divided into many petty sovereignties; no fixed property was secure; and that alone was valuable, which might be hurried away at the threatened approach of an invader. Many centuries after this, when, although one sovereign seemed to reign paramount over the whole of the kingdom, there continued to be endless contests among the feudal barons, and still that property alone was valuable which could be secured within the walls of the castle, or driven beyond the invader's reach, an immense stock of provisions was always stored up in the various fortresses, both for the vassals and the cattle; or it was contrived that the latter should be driven to the demesnes of some friendly baron, or concealed in some inland recess. When the winter had passed over in the castle of one of the Despencers, and the usual stock of provisions was comparatively exhausted, there yet remained in salt in the latter part of the spring, no fewer than eighty oxen, six hundred bacons, and six hundred sheep.

When, however, the government became more powerful and settled, and property of every kind was proportionably secured, as well as more equally divided, the plough came into use; and those agricultural productions were oftener cultivated, the reaping of which was sure after the labour of sowing had been expended. Cattle were now comparatively neglected, and for some centuries injuriously so. Their numbers diminished, and their size appears to have diminished too; and it is only within the last fifty years that any serious and successful efforts have been made materially to improve them.

In the comparative roving and uncertain life which our earlier and later ancestors led, their cattle would sometimes stray and be lost. The country was then overgrown with forests, and the beasts betook themselves to the recesses of these woods, and became wild, and sometimes ferocious. They by degress grew so numerous, as to be dangerous to the inhabitants of the neighbouring districts. One of the chronicles informs us, that many of them harboured in the forests in the neighbourhood of the metropolis. Strange stories are told of some of them, and doubtless, when irritated, they were fierce and dangerous enough. As, however, civilization advanced, and the forests became thinned and contracted, these animals were seldomer seen, and at length almost disappeared. A few of them yet remain in Chatelherault Park, belonging to the Duke of Hamilton, in Lanarkshire; and in the park of Chillingham Castle in Northumberland, the seat of the Earl of Tankerville. They are thus described in the latter place by Mr. Cully, in his valuable observations on live stock:—

'The wild breed, from being untameable, can only be kept within walls or good fences, consequently very few of them are now to be met with, except in the parks of some gentlemen, who keep them for ornament, and as a curiosity. Those I have seen are at Chillingham Castle, in Northumberland, a seat belonging to the Earl of Tankerville. Their colour is invariably of a creamy white, muzzle black; the whole of the inside of the ear, and about one-third of the outside, from the tips downwards, red; horns, white, with black tips, very fine, and bent upwards; some of the bulls have a thin upright mane, about an inch and a half or two inches long. The weight of the oxen is from thirty-five to forty-five stone, and the cows from twenty-five to thirty-five stone the four quarters (fourteen pound to the stone). The beef is finely *marbled*, and of excellent flavour. From the nature of their pasture, and the frequent agitation they are put into by the curiosity of strangers, it is scarcely to be expected they should be very fat; yet the six year old oxen are generally very good beef; from whence it may be fairly supposed, that in proper situations they would feed well.

'At the first appearance of any person they set off in full gallop, and, at the distance of about two hundred yards, make a wheel round, and come boldly up again, tossing their heads in a menacing manner; on a sudden they make a full stop at the distance of forty or fifty yards, looking wildly at the object of their surprise; but upon the least motion being made, they all again turn round, and fly off with equal speed, but not to the same distance, forming a shorter circle, and again returning with a bolder and more threatening aspect than before; they approach much nearer, probably within thirty yards, when they again make another stand, and then fly off; this they do several times, shortening their distance, and advancing nearer and nearer, till they come within such a short distance, that most people think it prudent to leave them, not choosing to provoke them further.

'The mode of killing them was perhaps the only remains of the grandeur of ancient hunting. On notice being given that a wild bull would be killed on a certain day, the inhabitants of the neighbourhood came mounted and armed with guns, &c., sometimes to the amount of an hundred horse, and four or five hundred foot, who stood upon walls, or got into trees, while the horsemen rode off the bull from the rest of the herd until he stood at bay, when a marksman dismounted and shot. At some of these huntings twenty or thirty shots have been fired before he was subdued. On such occasions the bleeding victim grew desperately furious, from the smartings of his wounds and the shouts of savage joy that were echoing on every side. But, from the number of accidents that happened, this dangerous mode has not been practised of late years; the park-keeper alone generally shooting them with a rifle gun at one shot.

'When the cows calve, they hide their calves for a week or ten days in some sequestered situation, and go and suckle them two or three times a day. If any person come near the calves, they clap their heads close to the ground, and lie like a hare in form, to hide themselves: this is a proof of their native wildness, and is corroborated by the following circumstance that happened to Mr. Bailey, of Chillingham, who found a hidden calf, two days old, very lean, and very weak; on stroking its head it got up, pawed two or three times like an old bull, bellowed very loud, stepped back a few steps, and bolted at his legs with all its force; it then began to paw again, bellowed, stepped back, and bolted as before; but knowing its intention, and stepping aside, it missed him, fell, and was so very weak that it could not rise, though it made several efforts; but it had done enough. The whole herd were alarmed, and coming to its rescue, obliged him to retire; for the dams allow no person to touch their calves without attacking them with impetuous ferocity. When any one happens to be wounded, or is grown weak and feeble, through age or sickness, the rest of the herd set on it and gore it to death.'

The breeds of cattle, as they are now found in Great Britain, are almost as various as the soil of the different districts, or the fancies of the breeders. They have, however, been very conveniently classed according to the comparative size of the horns: the *long horns*, originally, so far as our country is concerned, from Lancashire, much improved by Mr. Bakewell, of Leicestershire, and established through the greater part of the midland counties; the *short horns*, originally from East York, improved in Durham, mostly cultivated in the northern counties, and in Lincolnshire, and many of them found in every part of the kingdom where the farmer attends much to his dairy, or a large supply of milk is wanted; and the *middle horns*, not derived from a mixture of the two preceding, but a distinct and valuable and beautiful breed, inhabiting principally the north of Devon, the East of Sussex, Herefordshire, Gloucestershire; and, of diminished bulk, and with somewhat different character, the cattle of the Scottish and the Welsh mountains. The Alderney, with her *crumpled horn*, is found on the southern coast, and, in smaller numbers, in gentlemen's parks and pleasure grounds every where; while the polled, or *hornless* cattle, prevail in Suffolk, and Norfolk, and in Galloway, whence they were first derived.

These, however, have been intermingled in every possible way. They are found pure only in their native districts, or on the estates of some opulent and spirited individuals. Each county has its own mongrel breed, often difficult to be described, and not always to be traced—neglected enough, yet suited to the soil and to the climate; and, among little farmers, maintaining their station, and advantageously maintaining it, in spite of attempts at supposed improvements by the intermixture or substitution of foreign varieties.

The character of each, so far as it can be described, and the relative value of each for breeding, grazing, the dairy, or the plough, will be considered before we inquire into the structure or general and medical treatment of cattle. Much dispute has arisen as to the original breed of British cattle. The battle has been stoutly fought between the advocates of the middle and the long horns. The short horns and the polls can have no claim; the first is evidently of foreign extraction, and the latter, although it has existed in certain districts from time immemorial, was probably an accidental variety.

We are very much disposed to adjudge the honour to the '*middle horns*.' The *long horns* are evidently of Irish extraction, as in due place we shall endeavour to show.

Britain has shared the fate of other nations, and, oftener than them, although defended by the ocean on every side, she has been overrun and subjugated by ferocious invaders. As the natives retreated before the foe, they carried with them some portion of the wreck of their property. We have stated that their property, in early times, consisted principally in cattle. They naturally drove along with them as many as they could, when they retired to the fortresses of North Devon and Cornwall, or the more mountainous regions of Wales, or when they took refuge even in the wealds of East Sussex; and there retaining all their prejudices and customs and manners, they were jealous of the strict preservation of that which principally reminded them of their native country before it had yielded to a foreign yoke.

In this manner probably was preserved the ancient breed of British cattle. Difference of climate gradually wrought some change, and particularly in their bulk. The rich pasture of Sussex fattened the ox of that district into its superior size and weight. The plentiful but not so luxuriant herbage of the north of Devon produced a somewhat smaller and more active animal, while the occasional privations of Wales lessened the bulk and thickened the hide of the Welsh runt. As for Scotland, it, in a manner, set its invaders at defiance; or its inhabitants retreated for a while, and soon turned again on their pursuers. They were proud of their country, and proud of their cattle, their choicest possession; and there, too, the cattle were preserved, unmixed and undegenerated.

Thence it resulted, that in Devon, in Sussex, in Wales, and in Scotland, the cattle have been the same from time immemorial; while in all the Eastern coast, and through every district of Britain, the breed of cattle degenerated, or at least lost its original character; it consisted of a variety of animals, brought from every neighbouring and some remote districts, mingled in every possible variety, yet generally conforming itself to the soil and the climate.

The slightest observation will convince us that the cattle in Devonshire, Sussex, Wales, and Scotland, are essentially the same. They are middle-horned; tolerable, but not extraordinary milkers, and remarkable for the quality rather than the quantity of their milk; active at work; and with an unequalled aptitude to fatten. They have all the characters of the same breed, changed by soil and climate and time, yet little changed by the intermeddling of man. We may almost trace the colour, namely, the red of the Devon, the Sussex, and the Hereford; and even where the black alone are now found, the memory of the red prevails; it has a kind of superstitious reverence attached to it in the legends of the country; and in almost every part of Scotland, and in some of the mountains of Wales, the milk of the *red cow* is considered to be a remedy for every disease, and a preservative from every evil. Every one who has had opportunities of comparing the Devon cattle with the wild breed of Chatelherault park, or Chillingham castle, has been struck with the great resemblance in many points, notwithstanding the difference of colour, while they bear no likeness at all to the cattle of the neighbouring country.

For these reasons we consider the middle horns to be the native breed of Great Britain, and they shall first pass in review before us.

CHAPTER III.

THE MIDDLE HORNS.

The situation of Devonshire, at nearly the western extremity of the kingdom, and the undeniable fact, that one of the varieties of the middle horns is there found in a state of the greatest purity, render it the best as well as the most convenient point whence to start.

DEVONSHIRE.

The north of Devon has been long celebrated for a breed of cattle beautiful in the highest degree, and in activity at work and aptitude to fatten unrivalled. The native country of the North Devons, and where they are found in a state of the greatest purity, extends from the river Taw westward, skirting along the Bristol Channel; the breed becoming more mixed, and at length comparatively lost before we arrive at the Parrett. Inland it extends by Barnstaple, South Molton, and Chumleigh, as far as Tiverton, and thence to Wellington, where again the breed becomes unfrequent, or it is mixed before we reach Taunton. More eastward the Somersets and the Welsh mingle with it, or supersede it. To the south there prevails a larger variety, a cross probably of the North Devon with the Somerset; and on the west the Cornish cattle are found, or contaminate the breed. The true and somewhat prejudiced Devonshire man confines them within a narrower district, and will scarcely allow them to be found with any degree of purity beyond the boundaries of his native county. From Portlock to Biddeford, and a little to the north and the south, is, in his mind, the peculiar and only residence of the North Devon.

From the earliest records the breed has here remained the same; or if not quite as perfect as at the present moment, yet altered in no essential point until within the last thirty years*. That is not a little surprising when it is remembered that a considerable part of this district is not a breeding country, and that even a proportion, and that not a small one, of Devonshire cattle, are bred out of the county. On the borders of Somerset and Dorset, and partly in both, extending southward from Crewkerne, the country assumes the form of an extensive valley, and principally supplies the Exeter market with calves. Those that are dropped in February and March, are kept until May, and then sold to the drovers, who convey them to Exeter. They are there purchased by the Devonshire farmers, who keep them for two or three years, when they are sold to the Somersetshire graziers, who fatten them for the London market; so that a portion of the North Devon, and of the very finest of the breed, come from Somerset and Dorset.

The truth of the matter is, that the Devonshire farmers were, until nearly the close of the last century, not at all conscious that they possessed any thing superior to other breeds; but, like agriculturists everywhere else, they bought and bred without care or selection. It is only within the last fifty or sixty years that any systematic efforts have been made to improve the breeds of cattle in any part of the kingdom; and we must acknowledge, that the Devonshire men, with all their advantages, and with such good ground to work upon, were not the first to stir, and, for some time, were not the most zealous when they were roused to exertion. They are indebted to the nature of their soil and climate for the beautiful specimens which they possess of the native breed of our island, and they have retained this breed almost in spite of themselves.

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* Lord Somerville, a name justly esteemed among agriculturists, and an excellent judge of cattle, and who, from his residence in the county, may be supposed to be well acquainted with the excellences and defects of this breed, gives a long and very accurate and interesting account of them in the Annals of Agriculture, to which we would refer the reader.

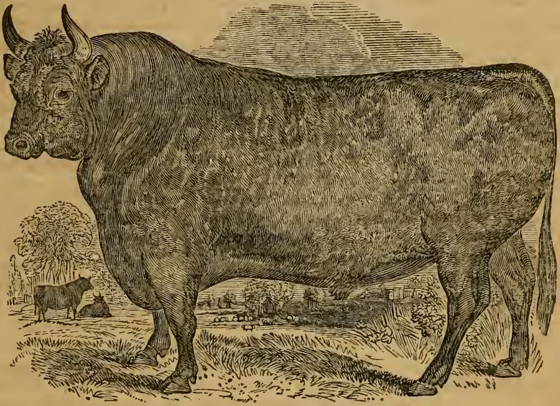
A spirit of emulation was at length kindled, and even the North Devons have been materially improved, and brought to such a degree of perfection, that, take them for all in all, they would suffer from intermixture with any other breed.

Before, however, we attempt to describe the peculiarities of this, or any other breed, it may be proper to give a short sketch of the proper form and shape of cattle. Whatever be the breed, there are certain conformations which are indispensable to the thriving and valuable ox or cow. When we have a clear idea of these, we shall be able more easily to form an accurate judgment of the breeds of the different counties as they pass before us. If there is one part of the frame, the form of which, more than of any other, renders the animal valuable, it is the chest. There must be room enough for the heart to beat, and the lungs to play, or sufficient blood for the purposes of nutriment and of strength will not be circulated; nor will it thoroughly undergo that vital change, which is essential to the proper discharge of every function. We look, therefore, first of all to the wide and deep girth about the heart and lungs. We must have both: the proportion in which the one or the other may preponderate, will depend on the service we require from the animal; we can excuse a slight degree of flatness of the sides, for he will be lighter in the forehand, and more active; but the grazier must have width as well as depth. And not only about the heart and lungs, but over the whole of the ribs, must we have both length and roundness; the *hooped*, as well as the deep barrel is essential; there must be room for the capacious paunch, room for the materials from which the blood is to be provided. The beast should also be ribbed home; there should be little space between the ribs and the hips. This seems to be indispensable in the ox, as it regards a good healthy constitution, and a propensity to fatten; but a largeness and drooping of the belly is excusable in the cow, or rather, notwithstanding it diminishes the beauty of the animal, it leaves room for the udder; and if it is also accompanied by swelling milk veins, it generally indicates her value in the dairy.

This roundness and depth of the barrel, however, is most advantageous in proportion as it is found behind the point of the elbow, more than between the shoulders and legs; or low down between the legs, rather than upwards towards the withers: for it diminishes the heaviness before, and the comparative bulk of the coarser parts of the animal, which is always a very great consideration.

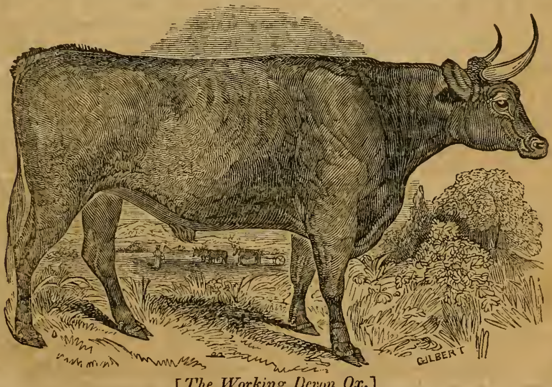
The loins should be wide: of this there can be no doubt, for they are the prime parts; they should seem to extend far along the back: and although the belly should not hang down, the flanks should be round and deep. Of the hips it is superfluous to say that, without being ragged, they should be large; round rather than wide, and presenting, when handled, plenty of muscle and fat. The thighs should be full and long, close together when viewed from behind, and the farther down they continue to be so the better. The legs short, varying like other parts according to the destination of the animal; but decidedly short, for there is an almost inseparable connexion between length of leg and lightness of carcase, and shortness of leg and propensity to fatten. The bones of the legs, and they only being taken as a sample of the bony structure of the frame, generally, should be small, but not too small—small enough for the well-known accompaniment, a propensity to fatten—small enough to please the consumer; but not so small as to indicate delicacy of constitution, and liability to disease.

Last of all the hide—the most important thing of all—thin, but not so thin as to indicate that the animal can endure no hardship; moveable, mellow, but not too loose, and particularly well covered with fine and soft hair We shall enter more fully and satisfactorily into this subject in the proper place; but this bird's-eye view may be useful. We return to the Devonshire cattle.



[*The Devon Bull.*]

The more perfect specimens of the North Devon breed are thus distinguished. The horn of the *bull* ought to be neither too low nor too high, tapering at the points, not too thick at the root, and of a yellow or waxy colour. The eye should be clear, bright, and prominent, showing much of



[*The Working Devon Ox.*]

the white, and it ought to have around it a circle of a variable colour, but usually a dark orange. The forehead should be flat, indented, and small; for by the smallness of the forehead, the purity of the breed is very much estimated. The cheek should be small, and the muzzle fine: the nose should be of a clear yellow. A black muzzle is disliked, and even a mottled one is objected to by some who pretend to be judges of the true Devon. The nostril should be high and open: the hair curled about the head, and giving, at first appearance, an idea of coarseness which soon wears off. The neck should be thick, and that sometimes almost to a fault.

Excepting in the head and neck the form of the bull does not materially differ from that of the ox, but he is considerably smaller. There are some exceptions, however, to this rule, and as an illustration of this, we have inserted (p. 13) the portrait of a pure Devon bull (belonging to Mr. Western,) father of the ox and the cow delineated at pages 16 and 17. We may fancy that we trace in this singular and noble animal, the lineaments of the native, and scarcely reclaimed British bull.

The head of the ox is small, very singularly so, relatively to the bulk of the animal, yet it has a striking breadth of forehead. It is clean and free from flesh about the jaws. The eye is very prominent, and the animal has a pleasing vivacity of countenance plainly distinguishing it from the heavy aspect of many other breeds. Its neck is long and thin, admirably adapting it for the collar, and even for the more common and ruder yoke.

The want of the beautifully arched form of the neck, which is seen in the horse, has been considered as a defect in most breeds of cattle. It is accounted one of the characters of good cattle, that the line of the neck from the horns to the withers should scarcely deviate from that of the back. In the Devonshire ox, however, there is a peculiar rising of the forehand, reminding us not a little of the blood-horse, and essentially connected with the free and quick action by which this breed has ever been distinguished. It has little or no dewlap depending from its throat, The horns are longer than those of the bull, smaller and fine even to the base, and of a lighter colour, and sometimes tipped with yellow. The animal is light in the withers; the shoulders a little oblique; the breast deep, and the bosom open and wide, particularly as contrasted with the fineness of the withers. The fore-legs are wide apart, looking like pillars that have to support a great weight. The point of the shoulder is rarely or never seen. There is no projection of bone as in the horse, but there is a kind of level line running on to the neck.

These are characteristic and important points. Angular bony projections are never found in a beast that carries much flesh and fat. The fineness of the withers, the slanting direction of the shoulder, and the broad and open breast, imply both strength and speed, and aptitude to fatten. A narrow-chested animal can never be useful either for working or grazing.

With all the lightness of the Devonshire ox, there is a point about him, disliked in the blood or riding-horse, and not always approved in the horse of light draught—the legs are far under the chest, or rather the breast projects far and wide before the legs. We see the advantage of this in the beast of slow draught, who rarely breaks into a trot, except when he is goaded on in *catching times*, and the division of whose foot secures him from stumbling. The lightness of the other parts of his form, however, counterbalances the appearance of heaviness here.

The legs are straight, at least in the best breeds. If they are in-kneed, or crooked in the fore-legs, it argues a deficiency in blood, and comparative incapacity for work; and not only for work, but for grazing too, for they will be hollow behind the withers, a point for which nothing can compensate, because it takes away so much from the place where good flesh and fat should be thickly laid on, and diminishes the capacity of the chest and the power of creating arterial and nutritious blood.

The fore-arm is particularly large and powerful. It swells out suddenly above the knee, but is soon lost in the substance of the shoulder. Below the knee the bone is small to a very extraordinary degree, indicating a seeming want of strength; but this impression immediately ceases, for the smallness is only in front—it is only in the bone: the leg is deep, and the sinews are far removed from the bone. It is the leg of the blood-horse, promising both strength and speed.* It may perhaps be objected that the leg is a little too long. It would be so in an animal that is destined only to graze; but this is a working animal, and some length of leg is necessary to get him pleasantly and actively over the ground.

There is a very trifling fall behind the withers, but no *hollowness*, and the line of the back is straight from them to the setting on of the tail. If there is any seeming fault in the beast, it is that the sides are a little too flat. It will appear, however, that this does not interfere with feeding, while a deep, although somewhat flat chest is best adapted for speed.

Not only is the breast broad and the chest deep, but the two last ribs are particularly bold and prominent, leaving room for the stomachs and other parts concerned in digestion to be fully developed. The hips, or huckles, are high, and on a level with the back, whether the beast is fat or lean. The hind quarters, or the space from the huckle to the point of the rump, are particularly long, and well filled up—a point likewise of very considerable importance both for grazing and working. It leaves room for flesh in the most valuable part, and. like the extensive and swelling quarters of the blood-horse, indicate much power behind, equally connected with strength and speed. This is an improvement quite of modern date. The fulness here, and the swelling out of the thigh below, are of much more consequence than the prominence of fat which is so much admired on the rump of many prize cattle.

The setting on of the tail is high; it is on a level with the back; rarely much elevated, and never depressed. This is another great point in the blood-horse, as connected with the perfection of the hind quarters. The tail itself is long and small, and taper, with a round bunch of hair at the bottom.

The skin of the Devon, notwithstanding his curly hair, is exceedingly mellow and elastic. Graziers know that there is not a more important point than this. When the skin can be easily raised from the hips, it shows that there is room to set on fat below.

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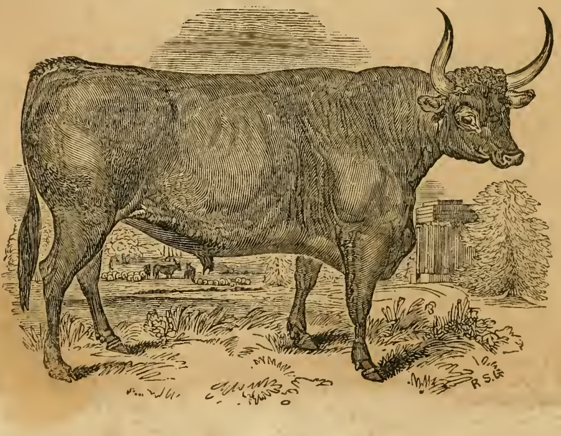
* It is sometimes not a little amusing to observe the seeming contrariety of opinion between excellent judges of cattle, and that on the very essential points of their conformation; and yet, when the matter is properly explained, the slight shade of difference there is between them. We have now lying before us letters from two very skilful Devonshire farmers. They have been so obliging as to give us their opinion as to the points of the Devonshire ox. One insists upon that, on which we confess we should lay very great stress, and without which we should reckon any beast almost valueless, namely, small bones under the knee, and a clean neck and throat. This gentleman we have the pleasure of knowing; he has been improving the size and weight of the Devonshire ox, anxiously preserving these points: nay, we know that he did steal a cross from one of the finest-boned and lightest Herefords he could procure. The other has sound principles of breeding, but he is a man of the old school: he had been educated in the belief that what he calls the true Devons are unrivalled, and he would deem it a kind of sacrilege to debase their blood by a cross with any other breed; yet experience has taught him, in spite of all his prejudices, and although he will not own it, that the old Devons have their faults, and, among them, too much flatness of chest and general lightness; he is, beside, a tillage farmer. He tells us that he does not like a fine neck, because it is accompanied by too narrow and light a breast, and that he does like large bones, because they will carry more meat. Why, these gentlemen were, in a measure both right, but their observations referred to cattle, which, although Devons, were essentially different.

The skin is thin rather than thick. Its appearance of thickness arises from the curly hair with which it is covered, and curly in proportion to the condition and health of the animal. Good judges of these cattle speak of these curls as running like little ripples of wind on a pond of water. Some of these cattle have the hair smooth, but then it should be fine and glossy. Those with curled hair are somewhat more hardy, and fatten more kindly. The favourite colour is a blood red. This is supposed to indicate purity of breed; but there are many good cattle approaching almost to a chestnut hue, or even a bay brown. If the eye is clear and good and the skin mellow, the paler colours will bear hard work, and fatten as well as others; but a beast with a pale skin, and hard under the hand, and the eye dark and dead, will be a sluggish worker, and an unprofitable feeder. Those, however, that are of a yellow colour, are said to be subject to *steat* (diarrhœa.)

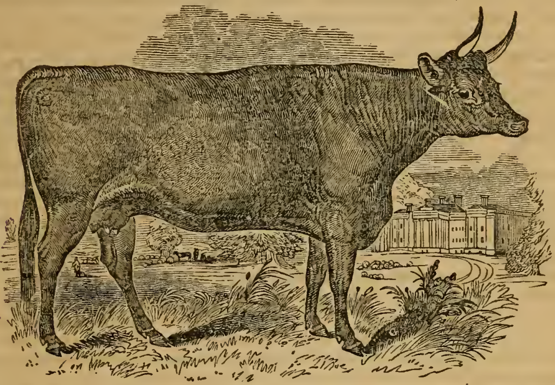
Some breeders object to the slightest intermixture of white—not even a star upon the forehead is allowed; yet a few good oxen have large distant patches of white; but if the colours run into each other, the beasts are condemned as of a mongrel and valueless breed.

These are the principal points of a good Devonshire ox; but he used to be, perhaps he is yet, a little too flat-sided, and the rump narrowed too rapidly behind the hip bones; he was not sufficiently ribbed home, or there was too much space between the hip bones and the last rib; and altogether he was too light for some tenacious and strong soils. The cut of the working ox, in page 13, contains the portrait of one formerly belonging to the Duke of Bedford. It embodies almost every good point of which we have spoken.

Mr. Western has kindly enabled us here to add another portrait from his farm. It is a son of the bull given at page 13, and is a faithful representation of an ox beginning to fatten, but his characteristic points not yet concealed. Mr. Western has carefully preserved this breed unmixed for the last thirty years, and all the cattle that he fattens are Devons; he rarely uses them for the plough.



A selection from the most perfect animals of the true breed—the bone still small and the neck fine, but the brisket deep and wide, and down to the knees, and not an atom of flatness all over the side—or one cross, and only one with the Hereford, and that stealthily made—these have improved the strength and bulk of the North Devon ox, without impairing, in the slightest degree, his activity, his beauty, or his propensity to fatten.*



There are few things more remarkable about the Devonshire cattle than the comparative smallness of the cow. The bull is a great deal less than the ox, and the cow almost as much smaller than the bull. This, however, is some disadvantage, and the breeders are aware of it; for, although it may not be necessary to have a large bull, and especially as those of any extraordinary size are seldom handsome in all their points, but somewhere or other present coarseness or deformity, it is almost impossible to procure large and serviceable oxen, except from a somewhat *roomy* cow. These cows, however, although small, possess that roundness and projection of the two or three last ribs, which make them actually more *roomy* than a careless examination of them would indicate. The cow is particularly distinguished for her full, round, clear eye, the gold coloured circle round the eye, and the same colour prevailing on the inside skin of the ear. The countenance cheerful, the muzzle orange or yellow, but the rest of the face having nothing of black, or even of white about it. The jaws free from thickness, and the throat free from dewlap. The points of the back and the hind quarters different from those of other breeds, having more of roundness and beauty, and being free from most of those angles by which good milkers are sometimes distinguished.

We are here enabled to present our readers with the portrait of a cow, belonging to that indefatigable agriculturist, Mr. Western. She was rising four years old. With regard to size she is a favourable specimen of the Devon cow. It will be seen at once how much more roomy and fit for breeding she is, than even her somewhat superior bulk would at first indicate. She is, perhaps, in a little better condition than cows generally are, or should be in order to yield their full quantity of milk.

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* In the 'Annals of Agriculture,' vol. xxx., p. 314, we have the opinion, in somewhat provincial terms, of a good west-country grazier, respecting the best form of the Devon cattle. 'He buys at all times, from Christmas to May-day, North Devons, that are bred from Portlock to Biddeford, such as are five or six years old. He chooses such as are small-horned, and of a yellow-coloured horn rather than white—small bones, as such beasts thrive best—rib bones round, not flat—a thick hide bad—a very thin one objectionable—blade bones, chuck—very thick and heavy in the bosom, as much weight lies there—the heavier in the shoulder the better, but not to elbow out—very wide and square from the points down to the thighs—middling in the belly—not cow-bellied—not tucked up.' As a grazier he is right; but this is not the true working Devonshire ox.

Their qualities may be referred to three points; their working, fattening, and milking.

Where the ground is not too heavy the Devonshire oxen are unrivalled at the plough. They have a quickness of action which no other breed can equal, and which very few horses exceed. They have also a degree of docility and goodness of temper, and also stoutness and honesty of work, to which many teams of horses cannot pretend. Vancouver, in his survey of Devonshire, says, that it is a common day's work on fallow land for four steers to plough two acres with a double furrow plough. Four good Devonshire steers will do as much work in the field, or on the road, as any three horses, and in as quick, and often quicker, time, although many farmers calculate two oxen to be equal to one horse. The principal objection to the Devonshire oxen is, that they have not sufficient strength for tenacious clayey soils: they will, however, exert their strength to the utmost, and stand many a dead pull, which few horses could be induced or forced to attempt. They are uniformly worked in yokes, and not in collars. Four oxen, or six growing steers, are the usual team employed in the plough.

There is a peculiarity in driving the ox team, which is very pleasing to the stranger, and the remembrance of which, connected with his early days, the native does not soon lose. A man and a boy attend each team; the boy chants that which can scarcely be regarded as any distinct tune, but which is a very pleasing succession of sounds, resembling the countertenor in the service of the cathedral. He sings away with unwearied lungs, as he trudges along almost from morning to night, while every now and then the ploughman, as he directs the movement of the team, puts in his lower notes, but in perfect concord. When the traveller stops in one of the Devonshire valleys, and hears this simple music from the drivers of the ploughs on the slope of the hill on either side, he experiences a pleasure which this operation of husbandry could scarcely be supposed to be capable of affording. This chanting is said to animate the oxen somewhat in the same way as the musical bells that are so prevalent in the same county. Certainly the oxen move along with an agility that would be scarcely expected from cattle; and the team may be watched a long while without one harsh word being heard, or the goad or the whip applied. The opponents of ox-husbandry should visit the valleys of north or south Devon, to see what this animal is capable of performing, and how he performs it.

The profit derived from the use of oxen in this district arises from the activity to which they are trained, and which is unknown in any other part of the kingdom. During harvest time, and in catching weather, they are sometimes trotted along with the empty waggons, at the rate of six miles an hour, a degree of speed which no other ox but the Devon has been able to stand.

It may appear singular to the traveller, that in some of the districts that are supposed to be the very head-quarters of the Devon cattle, they are seldom used for the plough. The explanation, however, is plain enough. The demand for them among graziers is so great, that the breeders obtain a renumerating price for them at an earlier age than that at which they are generally broken in for the plough.

They are usually taken into work at about two years, or twenty-six months old; and they are worked until they are four, or five or six: they are then grazed, or kept on hay, and in ten or twelve months, and without any further trouble, they are fit for the market. If the grass land is good, no corn, or cake, or turnips, are required for the first winter; but, of course, for a second winter these must be added. The grazier likes this breed best at five years-old. and they will usually, when taken from the plough, fetch as much money as at six. At eight, or nine years, or older they are rapidly declining in value.

Lord Somerville states, that after having been worked lightly on the hills for two years, they are bought at four years old by the tillage-farmer of the vales, and taken into hard work from four to six; and, what deserves consideration, an ox must be thus worked, in order for him to attain his fullest size. If he is kept idle until he is five or six, he will invariably be stinted in his growth. At six he reaches his full stature, unless he is naturally disposed to be of more than ordinary size, and then he continues to grow for another half-year.

Their next quality is their disposition to fatten, and very few rival them here. They do not, indeed, attain the great weight of some breeds; but, in a given time, they acquire more flesh, and with less consumption of food, and their flesh is beautiful in its kind. It is of that mottled, marbled character so pleasing to the eye, and to the taste. Some very satisfactory experiments have been made on this point.

Mr. Carpenter, a very intelligent farmer, informs us, that the Duke of Bedford, who has considerable property in the county of Devon, had some prime Hereford oxen sent to his Tavistock estate in the month of April, and he ordered some Devons to be bought in Crediton market at the latter end of the same month. The Devons were not in so good condition as the Herefords when they were put to grass, and cost about 5*l.* per head less than the Herefords; but at the latter end of December, when they were all sold to the butcher, the Devons were superior in fatness and in weight.

A more satisfactory experiment was made by the same nobleman. Six oxen were selected on November 16, 1797, and fed until December 10, 1798, and the following was the result.

	First weight.			Second weight.			Gained.				Zoor oil cake.	Turnips.	Hay
	cwt.	qrs.	lbs.	cwt.	qrs.	lbs.	cwt.	qrs.	lbs.	or stone.	lbs.	lbs.	lbs.
1 Hereford	17	0	1	18	3	0	1	2	27	24.3		2700	487
2 Do.	18	1	0	21	0	25	2	3	25	41.5	423	2712	432
3 Devon	14	1	7	17	2	7	3	1	0	45.4	438	2668	295
4 Do.	14	2	4	19	1	0	4	2	14	64.6	442	2056	442
5 Sussex	16	2	0	19	3	0	3	1	0	45.4	432	2655	392
6 Leicester	15	2	14	18	2	0	2	3	14	40.2	434	2652	400

An experiment of the same nature was made, in order to compare the fattening properties of the Glamorgan with the Devon. They were fed from January 6, to December 1, 1804, and the following was the result.

	First weight.			Second weight.			Gain.			
	cwt.	qrs.	lbs.	cwt.	qrs.	lbs.	cwt.	qrs.	lbs.	or stone.
1 Devon	13	1	7	17	3	7	4	2	0	63
2 Do.	16	0	10	20	3	14	4	3	2	67
3 Glamorgan	13	3	0	16	0	14	3	3	18	54.6

We are aware that other experiments have been instituted, and with different results. One was made about the same time at Petworth, by the Earl of Egremont. Nine oxen, consisting of three Herefords, three of the Sussex breed, and three Devons, were put up to fat. They were allowed only sixteen weeks, they had not the trial nearly of a twelvemonth, as in the Duke of Bedford's experiment, and the Devons were found to be lowest on the list, and that to a very considerable extent. These Devons, although selected fairly enough, were probably exceptions to their general character for rapid thriving. We are, however, compelled to add, that the Duke of Bedford has, to a considerable extent, changed his breed. at Woburn, and the Devons have, in a great degree, given way to the Herefords.*

The North Devon oxen are rarely shod, and very rarely lame.†

For the dairy, the North Devons must be acknowledged to be inferior to several other breeds. The milk is good, and yields more than an average proportion of cream and butter; but it is deficient in quantity. There are those, however, and no mean judges, who deny this, and select the North Devons even for the dairy.

Mr. Conyers, of Copt Hall, near Epping, a district almost exclusively devoted to the purposes of the dairy, preferred the North Devons on account of their large produce, whether in milk, butter, or by suckling. He thought that they held their milk longer than any other sort that he had tried; that they were liable to fewer disorders in their udders; and that being of small size, they did not eat more than half what larger cows consumed. He thus sums up his account of them: 'Upon an average, ten cows give me five dozen pounds of butter per week in the summer, and two dozen in the winter. A good North Devon cow fats two calves a year. My thirty North Devon cows have this year (about 1788) upon an average produced a profit of 13*l.* 14*s.* per cow.

Mr. Rogers, veterinary surgeon at Exeter, and to whom we are indebted for some valuable hints, says that the quality of the milk is good, and the quantity remunerating to the dairyman. Such is not, however, the common opinion. They are kept principally for their other good qualities, in order to preserve the breed; and because, as nurses, they are indeed excellent, and the calves thrive from their small quantity of milk, more rapidly than could possibly be expected.

This aboriginal breed of British cattle is a very valuable one, and seems to have arrived at the highest point of perfection of which it is capable. It is heavier than it was thirty years ago, yet fully as active. Its aptitude to fatten is increased, rather than diminished; and its property as a milker could not be improved, without probable or certain detriment to its grazing qualities.

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* Of the extent to which prejudice will mislead the best judges, we heve a remarkable instance in one of the most zealous patrons of the short horns in Worcestershire, who thus speaks of the Devonshire cattle in the Farmer's Magazine, February, 1827. 'Of the late maturity of the Devons I had an opportunity to form a tolerably correct opinion at Bridgewater fair, where the best possible muster of Devonshire oxen is made. I saw one, and only one good ox among them. With the exception of this animal, I did not see one level carcass, but a want of beef in the roasting parts, low and poor loins, coarse shoulders, bad twist, and a general want of the indications of inside proof.'

He saw one of these oxen after it was killed and he says, 'I never beheld a worse animal under similar circumstances. The meat was actually running about the stall, being nothing more than a mixture of flabby masses, deficient of firmness of texture and quality.'

† A writer in the 'Farmer's Magazine,' Mr. Herbert, thus describes the Devonshire ox: 'Nimble and free, outwalking many horses, healthy and hardy, and fattening even in a straw-yard, good tempered, will stand many a dead pull, fat in half the time of a Sussex, earlier to the yoke than steers of any other breed, lighter than the Sussex; but not so well horned, thin fleshed, light along the tops of his ribs, a sparkling cutter, and lean well intermixed with fat.'

Of the cow, he says, 'Red, starred, or white faced, better horned than the ox, very quiet, the playmate of the children, a sure breeder, a good milker, a quick fattener, fair grass-fed beef in three months. The ox from 110 to 130 stone, and has been fed to 170; and the cow, to 70 or 80.'

Mr. Rogers tells us, that two breeders with whom he is acquainted, have lately attempted to cross the North Devons with the Herefords, but that the result was not satisfactory. We can account for that. Those points in which the Devons were deficient thirty years ago, are now fully supplied, and we cordially agree with him, that all that is now wanting, is a judicious selection of the most perfect of the present breed, in order to preserve it in its state of greatest purity. Many of the breeders are as careless as they ever were; but the spirit of emulation is excited in others. Mr. Davy, of North Molton, lately sold a four-year old bull, for which the purchaser had determined to give one hundred guineas had it been asked; and Mr. Henwood of Crediton has now twenty-one cows, which, within a month from the period of losing their milk, would average at least ten score per quarter. The Duke of Somerset is a zealous patron and improver of the breed, and has some beautiful cattle; and, whatever may be the case at Woburn, the Duke of Bedford here gives almost exclusive preference to the Devons. When offering it as his opinion, that the Devonshire cattle are more than usually free from disease, Mr. Rogers gives a hint that may be useful in every district of the kingdom. He attributes, and very truly, the greater part of the maladies of cattle, and all those of the respiratory system, to injudicious exposure to cold and wet; and he asks whether the height and thickness of the Devonshire fences, as affording a comfortable shelter to the cattle, may not have much to do with this exemption from disease?

Mr. Roberts, veterinary surgeon at South Molton, informs us that the North Devons have been crossed with the Guernsey breed, and that the consequence has been, that they have been rendered more valuable for the dairy; but they have been so much injured for the plough, and for the grazier, that the breeders are jealous to preserve the old stock in their native purity. Mr. Roberts speaks of a gentleman of South Molton, who was very tenacious in preserving unsullied a breed of first-rate North Devons, and who refused fifty guineas for a cow in calf. He sold her, afterwards, for 32*l*, when she was thirteen years old. When this gentleman sold off his stock, twelve cows fetched on an average 30*l*. each.

Mr. Carpenter, to whom we have already alluded, says that ‘one cross of the North Devon with the Hereford is of advantage, as we have additional size and aptitude to fatten without losing activity.’ We apprehend that he refers to the state of these cattle some years ago, and when they were lighter, rather than to the present improved breed; but he very judiciously adds ‘it must be one cross alone—you must not exceed the first dash—or you destroy the activity in labour, which is the principal source of profit to a Devonshire farmer.’ He adds, ‘never introduce heifers; but get a bull of the very best blood, and after the first cross, return to the best Devon bull again, and continue until the white face is nearly extinct before you attempt to cross a second time. The Durhams have been tried, but they will not work, and are too much loaded with coarse plain meat in the fore-quarter.’

The treatment of the calf is nearly the same in every district of North Devon. The calves that are dropped at Michaelmas, and some time afterwards, are preferred to those that come in February, notwithstanding the additional trouble and expense during the winter. The calf is permitted to suck three times every day for a week. It is then used to the finger, and warm new milk is given it for three weeks longer. For two months afterwards it has plenty of warm scalded milk, mixed with a little finely-powdered linseed-cake. Its morning and evening meals are then gradually lessened; and, when it is four months old, it is quite weaned.*

Of the other districts of Devonshire little need be said. Towards the south, extending from Hartland towards Tiverton, the North Devons prevail, and in their greatest state of purity. There are more dairies than in the north, and supplied principally by the North Devon cows, and a few of the South Devons. Such are the differences of opinion even in neighbouring districts, that the later calves are here uniformly preferred, which are longer suckled, and afterwards fed with milk and linseed-meal.

Advancing more to the south, and towards the borders of Cornwall, a different breed presents itself, heavier and coarser. We have arrived now in the neighbourhood of Devonport, where larger cattle are required for the service of the navy; but we must go a little more to the south, and enter on the tract of country which extends from Tavistock to Newton Abbott before we have the South Devons in full perfection. They are a mixture of the North Devons with the native breed of the country; and so adapted do they seem to be to the soil, that all attempts to improve them, so far as grazing and fattening go, have utterly failed. They are often 14 cwt. to the four quarters; and steers of 2½ cwt. are got with fair hay and grass to weigh from six to nine cwt. They bear considerable resemblance to the Herefords, and sometimes the colour and the horn and the white face are so much alike in both, that it is difficult to distinguish between them, except that they are usually smaller than the Herefords.

There are few parts of the country in which there is such bad management, and utter neglect of the preservation of the breed as in this and the most eastern part of Devon. It is not properly a grazing district except in the neighbourhood of Tavistock; but young cattle are rather brought forward for after-grass or turnips elsewhere than finished here for the market, and the method in which this is conducted is not to be commended. If a calf look likely to fatten, it is suffered to run with the cow ten or twelve months, and then slaughtered. If others that had not before shown a disposition to thrive now start, they are forwarded as quickly as may be, and disposed of; and therefore it is, that all those that are retained, and by which the stock is to be kept up, are the very refuse of the farm. Yet the breed is not materially deteriorated. It has found a congenial climate, and it will flourish there in spite of neglect and injury. *The grand secret of breeding is to suit the breed to the soil and climate.* It is because this has not been studied, that those breeds which have been invaluable in certain districts, have proved altogether profitless, and unworthy of culture in others. The South Devons are equally profitable for the grazier, the breeder, and the butcher; but their flesh is not so delicate as that of the North Devons. They do for the consumption of the navy; but they will not suit the fastidious appetites of the inhabitants of Bath, and the metropolis.

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* The following account of the principal cattle fairs in Devonshire, and principally for the sale of the North Devon breed, is extracted from the Annals of Agriculture:—

'Those who would seek this breed at fairs, will find them first at Ashbrittle, a bordering parish between the two counties (Devonshire and Somerset), held for oxen on the 25th of February; but this does not terminate as to prices. Bishops Lydiard, five miles to the west of Taunton, on the 25th of March, for oxen also. At this and Wellington, which are greater fairs than Ashbrittle, prices of stock are fully ascertained. Barnstaple, the Friday before the 21st of April. The great monthly markets of Taunton, Wiveliscomb, Tiverton, and Moulton, carry on the business till the fairs of Crediton, the 11th of May. West Bagborough, the 12th, and Wiveliscomb the 13th. North Moulton, first Wednesday after the 12th of May. Bampton, Whit-Tuesday: and South Moulton, Wednesday before the 22d of June.'

The farmers in the neighbourhood of Dartmoor breed very few cattle. Their calves are usually procured from East Devon, or even from Somerset or Dorset. They are reared at the foot of the moors for the use of the miners. All, however, are not consumed; but the steers are sold to the farmers of the South Hams, who work them as long as they are serviceable; they are then transferred to the graziers from Somersetshire, or East Devon, or Dorset, by whom they are probably driven back to their native country, and prepared for the market of Bristol or London. A very curious peregrination this, which great numbers of the west-country cattle experience.

As we now travel eastward, we begin to lose all distinctness of breed. The vale of Exeter is a dairy district and, as such, contains all kinds of cattle, according to the fancy of the farmer. There are a few pure North Devons, more South Devons, and some Alderneys; but the majority are mongrels of every description: many of them, however, are excellent cows, and such as are found scattered over Cornwall, West Devonshire, Somerset, and part of Dorset.

As we advance along the south and the east, to Teignmouth, Exmouth, Sidmouth, and over the hill to the fruitful vale of Honiton, we do not find oxen so much used in husbandry. The soil is either a cold hard clay, or its flints would speedily destroy the feet of the oxen. The same variety of pure North and South Devons, and natives of that particular district, with intermixtures of every breed prevail, but the South Devons are principally seen. Some of these cows seem to unite the opposite qualities of fattening and milking. A South Devon has been known, soon after calving, to yield more than two pounds of butter a day; and many of the old southern native breed are equal to any short horns in the quantity of their milk, and far superior to them in its quality.

I must not quit this part of the country without describing the *clouted cream*, which is peculiar to the west of England. The milk is suffered to stand in a bell-metal vessel four and twenty hours; it is then placed over a small wood fire, so that the heat shall be very gradually communicated to it. After it has been over the fire about an hour and a half, and is approaching to the state of *simmering*, the vessel is struck every now and then with the knuckle, or is very carefully watched. As soon as it ceases to ring, or the first bubble appears, a slight agitation or simmering, previous to boiling, has commenced; and the secret of the preparation is that this simmering shall not proceed to boiling. The milk is immediately removed from the fire, and set by for twenty-four hours more. At the end of this time all the cream will have arisen, and be thick enough to cut with a knife. It is then carefully skimmed off. This is a great luxury with coffee or with tarts, and the Devonshire strawberries and cream need no praise.

The dairy people in these districts say, that it is the most profitable way of treating the milk; that five pounds of butter can he obtained from a given quantity, where only four would be yielded by the ordinary method; and that the butter is more saleable, on account of the pleasant taste it has acquired, and which even its occasional slight smoky flavour scarcely impairs. The milk is proportionably impoverished; but it also has gained a taste which renders it more grateful to the pigs; while it never scours them, but removes the diarrhœa produced by other food. The skim-milk cheese must, however, be abandoned, or if a little is made, it is exceedingly poor and tasteless.

CORNWALL.

For much valuable information with regard to the breed and management of the the cattle of Cornwall, we are indebted to Mr. Karkeek, veterinary surgeon at Truro. This gentleman observes, that fish, tin, and copper have long been considered the staple commodities of the county of Cornwall, while agriculture has been viewed as a secondary object of pursuit. There is no doubt that the pasturing of cattle, and the cultivation of the soil, constituted the principal employment of the early inhabitants; but their attention was not long confined to the vegetable productions of the earth after they had discovered that greater riches might be torn from its bowels than reaped on its surface; for although, when Cæsar invaded the island, the Damnonians (the inhabitants of Devon and Cornwall) possessed great numbers of cattle, yet in a few centuries their pastures were neglected, and all their skill and industry were exerted in digging up 'the ores that speak the county's sterling praise.'

Carew, the historian of Cornwall, says, that 'the people devoting themselves entirely to tin, their neighbours in Devonshire and Somersetshire hired their pastures at a rent, and stored them with the cattle which they brought from their own homes, and made their profits of the Cornish by cattle fed at their own doors. The same persons also supplied them at their markets with many hundred quarters of corn and horse-loads of bread.'

The state of agriculture has, however, within the last century or two, materially improved in this extreme western portion of the kingdom.

The native breed of Cornwall is still to be found on some of the moors of the western parts of the county, and in the possession of many of the little farmers. They are small, black, with horns rather short, very coarsely boned, with large offals, and rarely weighing more than three or four hundred weight. They bear an evident resemblance to the native breeds of Wales and Scotland. They are very hardy, and calculated to endure the changeable temperature of this peninsular and unevenly-surfaced county.

Although uncultivated and unimproved, this is far from being a bad breed of cattle. They are fair milkers; their thick hides keep out the cold and wet, and protect them from many diseases; they range on the moors, and coarse grounds, and commons in the summer, at little or no expense, and in the winter are satisfied with heath and furze, and a small quantity of straw; and when put upon better keep, they get fat with a rapidity scarcely credible.

A more prevailing and a better breed is an evident cross between the North Devon and the indigenous one of the county. It is somewhat larger, with well-formed head, and more upright horns, resembling, in the manner in which they are turned, those of the wild cattle of Chilingham Park. Their necks, like those of the Devons, are thin, rapidly narrowing from the breast towards the head. Their chests are deep, but rather narrow, and the legs a little longer than in some other favourite breeds. Their hind quarters are deep and full. They get fat in their points, but fall away much in their sides, and are thin in their belly-pieces; they therefore weigh light, and their hides are thin and unprofitable. They mostly bear some striking character of the North Devon—they have the same reddish-brown coat, bright dun muzzle, and ring about the eye.

In most parts of Cornwall, however, the extreme Western districts excepted, the true North Devons are found equal to any their native country will produce. Many spirited farmers go to Barnstaple, or South

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Molton and buy up great numbers of one and two-year-old steers, and work them until they are eight or ten years old: and, as often as they have opportunity, they purchase elsewhere the finest bulls and heifers that can be selected, from among the best Devonshire breeders. Some had objected to the apparently delicate frame and constitution of the North Devon, but he has always been found sufficiently hardy to endure even the changeable clime of Cornwall, where 'the smiles of summer, and the rage of storms,' often succeed each other in a few hours. The Rev. H. H. Tremayne, and J. P. Peter, Esq., were diligent breeders of the North Devon cattle; and this beautiful animal did not degenerate under their management.

The cows are chiefly of the Cornish and North Devon breeds; but in the principal towns, and on the sea coast, a few Alderneys are kept. A breed between the Cornish and the Alderney has been attempted, and with considerable success, and uniting the rare qualities of abundance of milk with aptitude to fatten.

The Durham breed has lately been introduced by Mr. Peter, and appears to have succeeded well in a few grazing districts. A cross between the Devon cow and the Durham bull is an evident improvement, for the animal thus produced is profitable both for the dairy and the butcher. It must, however, be confessed, that the majority of the Cornish farmers are partial to the North Devons, and they appear to be better adapted to the soil of this country than any other breed.

There is no particular management of the dairy cow in Cornwall. About November, the cows are turned for the winter into *crofts* or little fields that have been kept up for them. In the spring and summer, they go into larger or uninclosed ground. The fattening beasts are generally fed on turnips in the winter; and many of them are turned out from February to June for the home consumption of Devonport and Plymouth markets.

The Cornish land is not usually very rich, but the farmer is industrious, and manages well. In many places the sod is pared and burned for wheat; and after wheat come turnips, which produce much winter food, and a great deal of dung, yet not in sufficient quantity for the stock. The farmers are generally compelled to give their young stock, and even their older beasts, a great deal of straw. Sea-sand and sea-weed are often called into requisition for manure, and are found to be exceedingly useful.

Arthur Young describes the method of rearing their calves which is still pursued in a great part of the county. They are taken from the cow between the fourth and sixth day. Raw milk is then given to them for ten days or a fortnight; and afterwards scalded milk and gruel, in the quantity of three or four quarts in the morning and at night. A mixture of gruel and milk is found to be better than scalded milk alone. Some give their own family-broth, which is thought to be as good as, or better than, the gruel. The calves are fond of it, and thrive upon it; and the flavour of the salted provisions increases the appetite, and promotes digestion. One quart of broth or gruel is added to two quarts of milk. A little fine hay is now placed before them, which they soon begin to eat. For a little while after they are turned to grass, this food is continued, according to the quantity of milk in hand, or the goodness and quality of the pasture. When they are ten or fourteen weeks old; they need no more milk, and, a considerable time before this, the quantity is reduced to less than half. In some parts, the calves are, during the winter and after the two first months, reared solely on hay and turnips, the turnips being sliced for that purpose. Many of the best breeders place two calves to one cow.

In the summer, many farmers feed the calves from the pail with scalded milk, for a couple of months, and then turn them to grass.

Very little cheese is made in Cornwall, and that little is exceedingly bad. The butter, however, is excellent; and the Cornish housewives are as expert in making the delicious clouted cream as any of the Devonshire ones.

The system of letting cows out to labourers or poor people is not uncommon in Cornwall. It is a great accommodation to the hirer, and affords a good remuneration to the owner. The price varies with the situation and keep; but it is usually from six to eight pounds, the calf being the property of the owner of the beast.

A few years ago, oxen were employed in husbandry as frequently in Cornwall as in any part of Devonshire. Not only the North Devons, but the improved Cornish breed, were used for the purpose. Although small and light, they were active, docile, and hardy. The Cornish plough is almost as proverbial as the Devon; and it was formerly worked by four oxen, with a horse or two before them. This practice is now considerably on the decline, for experience has proved, that both oxen and horses are best worked by themselves. Oxen are also employed in *butts* and *wains*, substitutes for a kind of rude cart or waggon, and well adapted for the beasts that are to draw them, and the roads they are to travel.

They are brought to the yoke at three years old, and worked until they are seven or eight. They are as active as any horses; and, like the Devons, they are stimulated much more by the pleasing chaunt of the ploughboy than by the goad. They are shod, and *brakes* are generally used for this purpose.

Of late years, however, the use of oxen in husbandry is getting out of practice. The propriety and economy of this will be discussed in the proper place; but oxen are not now generally seen even in the plough, and on the road they are very rarely employed.

Except for home consumption, few cattle are fattened in Cornwall. and the store beasts are usually sent to Somersetshire, or other grazing counties.

DORSETSHIRE.

The ‘old Dorset ox’—but whether it is the indigenous breed of the county is a matter of doubt—has long horns. Some assert, and with an appearance of probability, that the true Dorset was a middle horn, somewhat resembling the South Devon, but not so large, and that the long horn is an importation from the northern or midland counties, or a mixture of the Hampshire, the Wiltshire, and perhaps the Oxfordshire. However, a long-horned breed, a rough sort of cattle, and far from handsome, has been so many years established in various parts of the county, that it is regarded by some as the original one. These have been crossed with the Devon bull, and evidently with advantage: they are hardy, good milkers, and fatten quickly. They are principally found in the eastern and northern divisions of the county. Towards the west, a mixture of the Devon and the Dorset prevails, and many farmers cultivate the pure Devons. The climate, however, does not appear to suit the true Devons, for they do not here grow to any great size; and some have said that they are even worse milkers than in their native district, and subject to various diseases, and particularly to diarrhœa. Mr. Nobbs, of Catstoke, is decidedly of this opinion.

The mixture of the Devon and the Dorset is an improvement on both. Some have obtained a still better kind of cattle by crossing again with the Durham: and others are, with every probability of success, engrafting the Hereford on the Dorset stock. Three points of superiority are said to be gained over the Devon cross:—larger size, more hardiness, and a disposition to yield a greater quantity of better milk.

The use of oxen for husbandry-work, had been for many years declining in this country; but it has of late, and to a somewhat extraordinary degree, revived in some districts. The oxen are oftener worked in collars than in yokes. The cattle used for the plough or the team are principally the pure North Devons, which are purchased at two years' old in the North Devon markets, worked two or three years, and then fatted—some for the London but mostly for the home markets; sometimes, however, a mixture of the Devon and Dorset is used for draught. In the northern part of the county we find crosses of almost every kind, including not only those from the neighbouring counties of Hants and Wilts, but from Oxford, Gloucester, Shropshire, and Leicestershire.

In the Dorset dairies, there can scarcely be said to be a decidedly prevailing breed. If the heifer is likely to make a good milker, that is all that is regarded, and little or no attention is paid to the shape, or colour, or size. About a fifth part of Dorsetshire is occupied by the vale of Blackmoor, a very rich pastoral country, and well adapted for the purposes of the dairy. A considerable quantity of butter and cheese is made here. On those farms where most butter is made, the Double Dorset cheese is manufactured from the skimmed milk alone, and which, when kept until it becomes 'blue-vinney'd,' is very much approved; it is, however, more celebrated in than out of the country. A great quantity of butter, both in its fresh and salted state, is sent to London.

A great many calves are sent from the Vale of Blackmoor in the spring of the year to Poole, and there shipped for Portsmouth; and the supply being greater than the demand, the butchers find it answer their purpose to forward much of it to the London market.

Much of this concise account of Dorsetshire we owe to Mr. W. C. Spooner, veterinary surgeon at Blandford.

SOMERSETSHIRE.

The North Devon cattle prevail along that part of the county which borders on Devon until we arrive in the neighbourhood of Wincaunton and Ilchester, where the pure breed is almost lost sight of. In the north of Somerset few of the Devons are to be seen; but along the coast, and even extending as far as Bristol and Bath, the purest breed of the Devons are preferred. They are valued for their aptitude to fatten, their quickness and honesty at work; and they are said to be better milkers than in their native county. They are of a larger size, for the soil is better, and the pasturage more luxuriant. It is on this account that the oxen bred in some parts, and particularly in the Vale of Taunton, although essentially Devons, are preferred to those from the greater part of Devonshire, and even from the neighbourhood of Barnstaple and South Molton. They are better for the grazier and for the dairy; and, if they are not quite so active as their progenitors, they have not lost their docility and freeness at work, and they have gained materially in strength.

Mr. Carpenter, to whom we have already referred, and who is now resident in the Vale of Taunton, informs us that the farmers in the south and south-west of Somerset are endeavouring to breed that sort of cattle that will answer for the pail, and the plough, and grazing—a very difficult point, as he acknowledges, to hit; for those that are of the *highest proof* (exhibiting those points or conformations of particular parts which usually indicate a propensity to fatten) are generally the worst milkers, both as to quantity and quality. This being, however, a dairy county as well as a grazing one, or more so, the principal point with them is a good show for milk. They are, for the most part, of the Devon red, and, as he thinks, the best suited for all purposes of any in the West of England. All that is necessary to keep them up in size and proof and of a good growth, is to change the bull every two years. This is a very important, although an overlooked and unappreciated principle of breeding, even where the stock is most select. No bull should be longer used by the same grazier, or some degree of deterioration will ensue.

It must, nevertheless, be confessed, that in the greater part of the county, and where the Devons are liked best for husbandry and for grazing, experience has taught many farmers to select another breed for the dairy. Some prefer the pure short horns, others the North Wilts, and a few a mixture between the two. The short horns, are very different from those that are seen any where else. They resemble neither the old nor the improved Durham or East York, but were originally made up of a mixture of the Devon with the old Somersetshire cow.

The Somersetshire cattle are thus described by Mr. Herbert, as they existed sixty or seventy years ago; but we can scarcely believe the account to be faithful. 'Somersetshire formerly had a breed of cattle which, from the crescent-form of its turned-up horn, seemed to be between the Sussex and the original short-horn (he must mean the middle horn, for the short horn is of foreign extraction;) useful and heavy; high on its legs, particularly behind. It was used for the supply of the shipping, and sent to Salisbury market, and thence forwarded to Portsmouth. The cows were good milkers, and fattened kindly.'

If we may judge of them from what the West Somersets are now, they were a valuable breed. They betray their Devonshire origin; but in the opinion of the Somersetshire farmers, they are far preferable to the native breed, and they have increased in size without losing any of their useful properties. There are few better judges than these Somersetshire men; for being the party concerned between the breeder on the one side, and the grazier on the other, and having opportunity daily to observe the failures or the success of each, they acquire a kind of intuitive knowledge of the points of cattle.

A few of the present West Somerset cattle are characterised by a peculiarity of colour. They are called *sheeted* oxen. The head, the neck, the shoulders, and the hind parts appear as if they were uncovered, while there is a sheet fairly and perfectly thrown over the barrel. They do not, however, exhibit the true Devon colour in these uncovered parts, for the hair is yellow, instead of a deep blood red, or almost brown colour.

In North Somerset few of the Devons are to be seen, but they are the same party-coloured kind of which I have just spoken.

Mr. Billingsley, in his Survey of Somerset, says, that in this district, extending from Bath and Frome on the east, to Uphill and Kingsroad on the west, the cows are mostly short horns, with some fine long horns from North Wilts. A heifer of three years old that discovers any disposition to fatten, is turned out of the dairy, because experience has convinced the owner that she will seldom or never prove a good milker; and the breeders in that part are often obliged to have recourse to Welsh nurses, because there is a deficiency of milk in the parent animal.

In the middle of Somersetshire, from the Mendip hills on the north, to Bridgewater on the West, and Chard on the south (principally a grazing country,) he says that the business is divided into a summer and winter feed. For summer fattening, the Devons are principally bought in Februrary, either in the nothern part of Devon, or the lower part of Somerset. They are purchased in tolerable condition, and consume, between February and their turning out, ten or twelve hundred weight of inferior hay, the skimming of the summer leas. When at grass, they are allowed from an acre to an acre and a half per ox, and perhaps one sheep to each ox, and not more than one horse to twenty acres. About Michaelmas they are fat, and pay from three shillings and sixpence to four shillings per week for their keep. The farmers in that district think that frequent bleedings in small quantities accelerate the process of fattening.

The home-breds are usually preferred for fattening. The Rev. Mr. King of Budgworth Rectory, informs us that an ox is purchased, or, if bred, turned off to graze in Februrary. He has one and a half acre or more of the best pasture for summer feed; then comes the same range of aftermath from the beginning of September to the end of November; hay being added by degrees, until it is required entirely. These oxen are sold for the Salisbury or London markets, either before Christmas, or from that to Lady-day. A dairy farmer seldom grazes, except an old cow for the benefit of his neighbours; and these seldom get more than four or six months grazing after they are dried up. Beef of this description is as plentiful in the autumn as veal in the summer, and about the same price (1832,) from fourpence to fivepence per pound.

Some farmers graze heifers in preference to oxen, buying in March and April, and selling in October or November; and which are stocked at the rate of a heifer to each acre, with one or two sheep. The sheep thus fatted are usually the two year old Dorsets or Somersets.

Some give their prime oxen a second summer grass; and the second year pays better than the first, for an animal nearly fat will consume much less food than a lean one.

The time of calving is from the beginning of February to Lady-day. The farmers take great care to keep their cows in good condition for three weeks or a month before they calve, thinking that the milk will flow in proportion to the goodness of the keep at that time; and the consequence of this is frequent attacks of puerperal fever and garget. The number of calves reared in this district is very great. Four hundred fat calves have been sold in Shepton-Mallet market in one day, but now the village butchers buy and slaughter them at home, and take the carcasses to Bristol for the Tuesday and Saturday markets.

The calves that are reared are principally fed on cheese-whey, and are turned out to grass in May to shift for themselves. In the south-east part of this district, where the dairy-lands are chiefly applied to the making of butter and skim-milk cheese, the calves are taken from their mothers at about three days old. Those that are to be fatted are suckled by hand out of the pail as soon as it is brought home from the field morning and evening. These calves are technically said to be *on the stage.* It will take the milk of three cows to fatten two calves up to from thirty-five to fifty pounds per quarter. The old practice of giving the calves mead or some other home-made wine is now discontinued. Soon after Lady-day when the great business of cheese-making begins in good earnest, the milk is wanted for the cheese-vat instead of the suckling-pail. To fatten the calf, the farmer's wife then places the whey over the fire in a large copper, and the warmth forces a further portion of poorer curd (*skim curds*,) and these, with a little milk, and with the occasional addition of linseed meal, make a good calf. The calves to be reared are thought to be well off, if like the pigs, they get whey.

The celebrated Bridgewater cheese is made on the marshes between that town and Cross. Huntspill, South Brent, and East Brent, are the three prime cheese-parishes. The mail-road from Bridgewater to Cross passes through each of them. The land is rich and cool, and the pasturage not only old, but principally consisting of blade grasses, with few flowers or odoriferous herbs to raise or produce that essential oil which is so detrimental in the manufacture of cheese. Mr. King further informs us, that the present dairy cow of this district is either entirely red, which shows her Devon origin, or red with a white face which marks the Hereford cross or spotted red and white, and that the latter are generally peferred as the best milkers. They spring from Durham blood on one side, and the farmers of this district are much indebted to the late Mr. Stone, of South Brent, who, at a considerable expense, introduced several bulls of the Durham breed.

The usual proportion in a dairy of forty cows is about twenty-five red ones, ten spotted, and five with a white face, and yet, as the Hereford bull has been rarely if at all tried in this district, the white face is not owned by the farmer as of Herefordshire origin. A Durham ox, of Mr. King's breed from Warwickshire, was lately slaughtered here, weighing 21 score and 13lb. per quarter. It was fed by Mr. Burman, of Henley-in-Arden.

Very little of the prime Cheddar cheese is made at that village. It is chiefly manufactured in the parishes just mentioned, and in the marshes round Glastonbury. A somewhat inferior Cheddar is often sold as *double Gloucester*. As in the Vale of Berkeley, the cows are pastured and milked near to the farm-house, and the milk set with the rennet as soon as possible and left undisturbed for two hours. The curd is then broken; a portion of the whey first warmed and put to it, and then the whole of the whey made scalding hot, and poured upon it, and left for half an hour. The curd is afterwards put into the vat, and the other processes conducted much in the usual way. The scalding is supposed to favour an intimate union of the particles of the whey, and likewise to dispose the oleaginous matter to exude, and thus give the cheese that soft, rich, fatty appearance and flavour by which it is distinguished.

Mr. King recommends the addition of one Guernsey to every dozen country-cows. He thinks that this quantity of rich milk being added might make the whole throw a greater weight of curd. It certainly is so when butter is the object, and that small quantity would not injure the keeping. Guernsey butter unmixed is too rich and will not keep, and so it might be with cheese.

The Somersetshire dairymen usually keep their cows until they are ten or twelve years old, and then turn them off for failing, not in the quantity but the quality of the milk. At this time they are reduced to half the value of a long-horned cow of the same age; but if it should appear, as it generally will, that the short-horn will make a half-hundred of cheese more every season than the long horned Wilts, and at the same time cost less for the keep, the balance will be found to be in favour of the short or middle-horned Somerset. In the upper part of the country, and where heifers are preferred, the graziers go into North Wilts and Hampshire to buy them. Some of the best of them are nearly equal to the Devons, but in general they are not so *high in proof.* Occasionally they are brought from Gloucestershire, and even from Yorkshire, and are now and then sold in October at thirty-eight or forty score pounds each.

Many Irish cattle are fattened in Somersetshire, on account of the cheap rate at which they are purchased when lean.

HEREFORDSHIRE.

The Herefordshire white-faced breed, with the exception of a very few Alderney and Durham cows, have almost exclusive possession of this county. The Hereford oxen are considerably larger than the North Devons. They are usually of a darker red; some of them are brown, and even yellow, and a few are brindled; but they are principally distinguished by their white faces, throats, and bellies. In a few the white extends to the shoulders. The old Herefords were brown or red-brown with not a spot of white about them. It is only within the last fifty or sixty years that it has been the fashion to breed for white faces. Whatever may be thought of the change of colour, the present breed is certainly far superior to the old one. The hide is considerably thicker than that of the Devon, and the beasts are more hardy. Compared with the Devons, they are shorter in the leg, and also in the carcass; higher, and broader, and heavier in the chine; rounder and wider across the hips, and better covered with fat; the thigh fuller and more muscular, and the shoulders larger and coarser. The cut in the following page, is the portrait of an ox belonging to the Duke of Bedford.

Mr. Marshall gives the following account of them: it is tolerably correct, but does not sufficiently distinguish them from their kindred breed. 'The countenance pleasant, cheerful, open; the forehead broad; eye full and lively; horns bright, taper, and spreading; head small; chap lean; neck long and tapering; chest deep; bosom broad, and projecting forward; shoulder-bone thin, flat, no way protuberant in bone (?), but full and mellow in flesh; chest full; loin broad; hips standing wide, and level with the chine; quarters long, and wide at the neck; rump even with the level of the back, and not drooping, nor standing high and sharp above the quarters; tail slender and neatly haired; barrel round and roomy; the carcass throughout deep and well spread; ribs broad, standing flat and close on the outer surface, forming a smooth, even barrel, the hindmost large and full of length; round bone small, snug, and not prominent; thigh clean, and regularly tapering; legs upright and short; bone below the knee and hock small; feet of middle size; flank large; flesh every where mellow, soft, and yielding pleasantly to the touch, especially on the chine, the shoulder, and the ribs; hide mellow, supple, of a middle thickness, and loose on the neck and huckle; coat neatly haired, bright and silky; colour, a middle red, with a bald face characteristic of the true Herefordshire breed.'

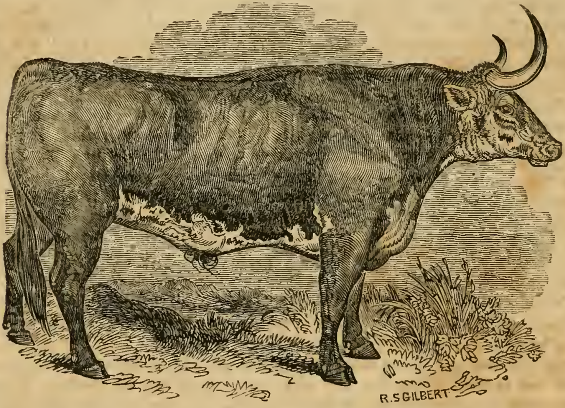
They fatten to a much greater weight than the Devons, and run from fifty to seventy score. A tolerable cow will average from thirty-five to fifty score. A cow belonging to the Duke of Bedford weighed more than seventy score; and an ox belonging to Mr. Westcar exceeded one hundred and ten score. They are not now much used for husbandry, though their form adapts them for the heavier work; and they have all the honesty and docility of the Devon ox, and greater strength, if not his activity. The Herefordshire ox fattens speedily at a very early age, and it is therefore more advantageous to the farmer, and perhaps to the country, that he should go to market at three years old, than be kept longer to be employed as a beast of draught. We are indebted to Mr. A. Knight, of Downton Castle, for some valuable observations on this and other subjects connected with the Herefordshire cattle, and breeding in general, of which we shall avail ourselves in the proper place.

They are far worse milkers than the Devons. This is so generally acknowledged, that while there are many dairies of Devon cows in various parts of the country, (none of which, however, are very profitable to their owners,) a dairy of Herefords is rarely to be found.

To compensate for this, they are even more kindly feeders than the Devons, and will live and grow fat where a Devon would scarcely live. Their beef may be objected to by some as being occasionally a little too large in the bone, and the forequarters being coarse and heavy; but the meat of the best pieces is often very fine-grained and beautifully marbled. There are few cattle more prized in the market than the genuine Herefords.

The Devons and the Herefords are both excellent breeds, and the prejudices of the Devonshire and Herefordshire farmers for their peculiar breed being set aside, a cross of the one will often materially improve the other. The Devon will acquire bulk and hardihood, and the Hereford a finer form and activity. The Hereford bull, and the West Highland or Kyloe cows, have been tried, but they did not feed so rapidly, nor weigh so well as the Hereford, and they had the defect of being extremely pugnacious.

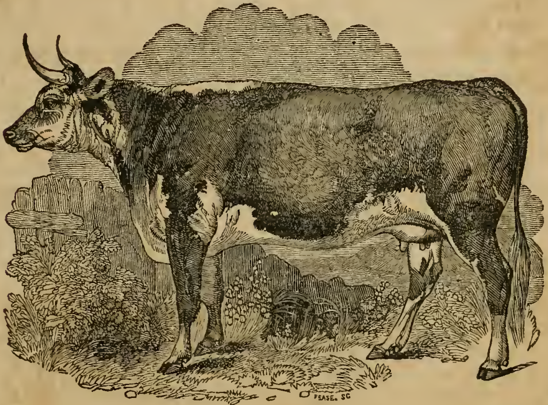
Mr. Culley, although an excellent judge of cattle, formed a very erroneous opinion of the Herefords when he pronounced them to be nothing but a mixture of the Welsh with a bastard race of long-horns. They are evidently an aboriginal breed, and descended from the same stock as the Devons. If it were not for the white face, and somewhat larger head and thicker neck, it would not at all times be easy to distinguish between a heavy Devon and a light Hereford. Their white faces may probably be traced to a cross with their not distant relations, the Montgomeries.



The Hereford cow is apparently a very inferior animal. Not only is she no milker, but even her form has been sacrificed by the breeder. Herefordshire is more a rearing than a feeding county, and therefore the farmer looks mostly to the shape and value of his young stock; and in the choice of his cow, he does not value her or select her, or breed from her according to her milking qualities, or the price which the grazier would give for her, but in proportion as she possesses that general form which experience has taught him will render her likely to produce a good ox. Hence the Hereford cow is comparatively small and delicate, and some would call her ill-made. She is very light-fleshed when in common condition, and beyond that, while she is breeding, she is not suffered to proceed;

but when she is actually put up for fattening, she spreads out, and accumulates fat at a most extraordinary rate. Our cut gives us the portrait of a beautiful cow, once belonging to the Earl of Egremont.

The breeder has been taught by experience, that when the cow, although she should be somewhat *roomy*, is too large and masculine, the ox will be brawny and coarse, and perhaps a little sluggish at work, and even somewhat unkind and slow in the process of fattening, and these are objections which, most of all, he would be unwilling to have justly made. The Herefordshire cow is therefore somewhat undersized; and it not unfrequently happens that she produces a bull-calf that grows to three times her own weight.



[*The Herefordshire Cow*]

Kindly as the Hereford ox fattens, very few are grazed in their native country: even the beasts which the home consumption requires are principally heifers and old cows. The oxen are sold at five and six years old in tolerable condition, at the Michaelmas fair in Hereford, to the graziers of Buckinghamshire and the neighbouring counties, by whom they are principally preferred for the London market.

The fertility of the soil in Herefordshire has been very much overrated. The traveller, and the superficial observer, have been misled by the luxuriant woods and rich alluvial soil upon the banks of its rivers. The pasture-grounds are generally poor, and the herbage is not nutritious, and therefore the farmer naturally confines his chief attention to his rearing-stock. The Dairy has been comparatively neglected; for experience has proved that the breeding qualities of a cow are materially lessened, and even her form is deteriorated, by her being inclined to give a large quantity of milk.

A very interesting trial was made in the winter of 1828-29, between the Herefords and the improved short-horned breeds of cattle, in the ordinary mode of feeding, without forcing by artificial food of any description, and the result seemed to be much to the advantage of the Herefords, considering their original weight, and the quantity of food consumed. It must, however, be confessed that it is not sufficient to enable us to decide upon the relative merits of the two rival breeds of large cattle, nor are we yet quite prepared for the inquiry; but we insert it as an experiment that was fairly conducted, to which the advocates of the Herefordshire cattle often refer, and which they will naturally expect to be placed upon record.

Three Herefords and three short-horns were selected: they were put together in a straw-yard on the 20th of December, 1827, and were fed in the open yard; at the rate of one bushel of turnips per beast per day, with straw only, until May 2d, 1828, when their weights were taken, and they were sent to grass.

	Cwts.	qrs.	lbs.		Cwts.	qrs.	lbs.
No. 1. Hereford	8	3	0	No. 1. Short-horn	9	2	0
2. "	7	3	0	2. "	8	2	0
3. "	7	0	0	3. "	9	0	0

On the 3d of November they were taken from grass, and put into the stall, when their weight was as follows:—

	Cwts.	qrs.	lbs.		Cwts.	qrs.	lbs.
No. 1. Hereford	11	3	0	No. 1. Short-horn	12	3	14
2. "	10	2	0	2. "	12	2	0
3. "	10	3	0	3. "	12	3	0

From that time to the 25th of March, 1829, they consumed the following quantities of Swedish turnips and hay:—

	Turnips. lbs.	Hay. lbs.
The Herefords . .	46,655	5065
The short-horns . .	59,430	6779

They then weighed—

No. 1. Hereford	13	0	14	No. 1. Short-horn	14	2	0
2. "	12	0	0	2. "	14	3	14
3. "	12	0	0	3. "	14	2	14

being an increase of weight in favour of the Herefords of	13	2	14
and in favour of the Short-horns . . .	17	2	0
and making a difference in favour of the Short-horns of	3	3	14

but then the Short-horns had consumed 12,775lbs. more of turnips, and 1714lbs. more of hay.

When they were all sold together at Smithfield on the 30th of March, the heavier short-horns fetched 97*l.*, and the lighter Herefords 96*l.*, being an overplus of only 1*l.* to pay for the enormous difference in the food consumed, and the greater price given on account of the heavier weight of the short-horns at the commencement of the experiment.* Another Hereford and a short-horn were also tried together at the same time; but they did not undergo the same process, nor was so regular an account kept of their progress. The Hereford increased in weight 3 cwt. 3 qrs., and the short-horn 4 cwt. 1 qr.

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* The Michaelmas cattle fair at Hereford is not exceeded by any show of beasts in good condition in the kingdom. They are usually sold to the graziers in the neighbourhood of the metropolis, by whom they are prepared for the Smithfield market.

There is an entry in an account book kept by William Town, in the neighbourhood of Hereford, in the year 1694, of the price of fat oxen at that period.

'25th August, 1694:—sold the nine oxen at 52*l.*; the money to be paid into the Exchequer within a month.' The price of oxen is, at least, six times as great now.

GLOUCESTER.

This county is taken next, because, bordering on Hereford, many of the cattle of that county are found here. Throughout the whole of Gloucestershire the Herefords are preferred for working and for fattening. They are less active than the Devons, but far more so than the Gloucesters. They consume less food, when at work, and very far less when fattening; but the Gloucesters are superior to the Herefords for the pail. Cattle of every kind, however, prevail in the dairy farms in this county, as in every other district.

Of the old breed of the Gloucesters it is now difficult to speak, for they are nearly extinct. They were evidently of Welsh origin, mingled with the Hereford, and sometimes with the cattle farther inland. They were the Glamorgan chiefly, but upon a larger scale, and of a different colour. The Glamorgans are black, or inclining to brown; the old Gloucesters were either red or brown. The horns were of a middle length, white, and tipped with black; the bones small, and the carcass light, scarcely averaging more than twelve score per quarter. The bag was thin yet large, and the milk abundant and long continued. The characteristic mark was said to be a streak of white generally along the back, and always at the root of the tail.

Many years ago the farmers began to cross them with the long-horns, and principally those from North Wilts. Thence arose considerable increase of size, with more tendency to fatten, and richer and not much less abundant milk. This breed is principally found in the hilly district of Gloucester, about the Cotswolds. Some farmers, indeed, have crossed so frequently with the long-horn, that little of the old Gloucester remains, and not a few use the long-horns alone. The prevailing breed, however, about the hills, and particularly among the small farmers, is the Gloucester and the Wiltshire combined. Some Suffolk duns are scattered in a few places; some pure Devons, Durhams and Leicesters are found, but chiefly a mixture from among them all, the Gloucesters and the North Wilts preponderating, while each farmer breeds and chooses according to his pleasure or caprice.

In the hilly part of the county cattle are an inferior object of consideration; there is little peculiar in the management of them; and even that little does not deserve commendation. The principal purpose for which they are here kept is to pasture on those spots which are unsound for sheep. A great proportion of many of the farms in this poor district can only be made profitable by turning young stock upon them; which, however, are never thoroughly fattened there, but the young stock, and the cows, and even the sheep, are sold to graziers from the neighbouring districts, barely in tolerable store condition. The early-dropped calves are chosen for rearing; the others might not have sufficient strength to endure the winter, and are speedily got rid of.

The calves that are to be reared continue two or three days with the mother, sucking as they like, and taking the milk that is good for nothing else. They are then fed with skim-milk a little warmed, being first taught with the finger; but they soon drink eagerly out of the pail. Linseed tea is after a little while mixed with the milk; afterwards the milk is laid aside, and oat or barley meal is stirred in with the tea; and so they are gradually brought to solid food, and weaned.

When the grass begins to fail in November, they are fed in the field, where there is some tolerable shelter for them; and the yearlings are also in the field, and fed with straw instead of hay. The pasture allotted to them is generally old and good, but such as had been previously eaten bare by the cows. Worse than all, during the early part of the winter the milch cows have nothing but straw allowed them. It is the custom in this part of the country not to take much care of the two-year-olds until Christmas is past. The heifers usually calve in April or May, and are taken into the dairy, and the steers then go to work after Christmas, when hay, but not of the best quality, is allowed them.

This system of starvation, partly induced by the nature of the soil, (sufficient fodder not being produced for the proper nutriment of the stock,) and partly attributable to an absurd mode of treatment derived from their forefathers, has a tendency to cripple the improvement of live stock. The calves will not attain their full growth, and the cows will not yield sufficient milk for suckling or for the pail while this system is pursued. There is room for much improvement here, as well as in many other districts of the kingdom in the management of live stock.

In the *lower* or *vale* part of the county, where cattle are kept principally for the dairy, and not to feed on the unsound and rotting ground, a more liberal and a more profitable system of management is adopted.

In the Vale of Berkeley, as the long and rich tract of land is called that reaches from the Cotswolds to the Severn, the cows are, as in the hilly district, of various sorts and kinds. In all of them, however, traces of the old Gloucester are visible, and carefully preserved. The cross depends upon the fancy of the dairyman. Some have mingled the Alderney with the Gloucester, and they have both increased the quantity and the richness of the milk; others have mixed the Wilts and the Gloucester, and they have a fair supply of excellent milk; while some have introduced the Yorkshire, whereby they have certainly added to the quantity, although perhaps a little deteriorated the quality of the milk: but the majority, and still more judiciously have mingled all these together, and they have materially improved both the quantity and the quality. There are no Herefords for the pail; a few Devons, some Suffolks, some North Wilts, and the rest Gloucesters, with various crosses.

A cross between the Gloucester and the Hereford has been attempted with considerable success. They yield from four to six gallons of good milk every day. It is difficult to account for the fact that, while in grazing counties the large and small farmers agree in selecting a certain breed, and adhere to that selection, almost every dairy district is characterized by a motley assemblage of all sorts and kinds of cattle. We shall often have occasion to allude to this.

This is a celebrated dairy country. From the Vale of Berkeley is produced a great part of the cheese, which is known in every part of the kingdom under the names of the single and double Gloucester.

A slight sketch of the peculiar management of this district must now be given to render our work perfect; but for a more detailed account, the reader is referred to the Twenty-first Number of the farmer's Series, in which the usual management both of the Gloucestershire hill and vale farms is fully described.

The calves remain with the mothers about a week. They are then fed with skim-milk, first, by means of the feeder's fingers introduced into the mouth, and which being supplied with milk, are sucked by the calves; but they soon drink of themselves. Linseed tea is, after a little while, mixed with the milk; and soon after that the milk is quite withdrawn, and oat or barley meal stirred with the linseed, until the calf is able to eat hay or oats. About the middle of May they are turned out to good grass, and so they are kept until the grass is ready for them, on the earliest and best of which they are turned. From among the early ones, or those dropped before March, a selection is made to keep up the dairy, and those from the best milkers are uniformly chosen. The farmer is right here; for every quality, both good and bad, is more decidedly hereditary than many have supposed, or are willing to allow. Some of the heifers that are weaned before March drop their calves when two years and a quarter old, and all of them are taken into the dairy at three years' old.

The land here is rich and productive, and fodder of every kind is abundant. The cattle are much better kept than in the hill country, and they pay their proprietors well for the additional trouble and expense. The richest even of these fertile pastures are set apart for the milch cows; and in order that their appetite may not pall, they are frequently moved from pasture to pasture. This a method of rendering them productive of which the majority of farmers are not aware. At the same time the farm is as much understocked as a hill-farm is too frequently overstocked; at least there is plenty of good keep for every cow.

It has been found that land, which has been lately and much manured, is not so good for the cows. The milk may be more abundant, but not so rich. Dr. Rudge, in his Survey of Gloucestershire, says, that there were two grounds adjoining each other alternately used for the pasture of cows. While they were on one, excellent cheese was made; but when they were on the other, the cheese was rank, heaving, and hollow, and unfit for the market. The latter had been lately well-dressed with manure; and the dairywoman remarked that, if the farmer continued to enrich his land with dung, she must give up making cheese.

The cows are early moved from the pasture-ground into the after-grass. Experience has taught the farmer that few things are more conducive to the general health of the animal, as well as the abundant supply of milk, than the first flush of grass in the spring, or after mowing.

As the winter comes on, they are moved into the driest and best-sheltered situations. It would be advantageous if there was some shed for them to retreat to as a protection from the extreme cold; and they should have plenty of good hay allowed them once or twice in the day, before they have calved, and several times in the day afterwards. In some cases, however, although not by the generality of farmers, the system of false economy prevalent in the hilly district is adopted here, and the cows in calf, and the young and store beasts, are half-starved during the winter. There is no part of dairy and cattle management which more demands reformation than this.

The principal product of the Vale of Berkeley is its cheese. It has a peculiar flavour, and is deservedly esteemed. It is not quite clear to what peculiar circumstance the excellence of the Gloucester cheese is to be attributed; for several things, probably, combine to produce the effect.

The breed of the cow has little or nothing to do with it. We have stated that almost every variety of breed is found here, and the milk of all is mingled together. The cows are taken better care of. The pasture is good, and it is old, and is composed of the natural grasses of the country, which are grown here with little admixture of foreign or artificial ones. The fields, another circumstance not sufficiently appreciated, are near to, and surround as much as possible the farm-houses, so that the milk is but little agitated, or the component parts of it separated before it is curdled by the rennet. By this means, too, the milk may be set, before it is cooled below the proper temperature.

Every dairymaid knows well that the milk should be warm when it is set. She has rarely any thermometer to guide her. She needs it not, for she can tell with the accuracy of the best thermometer whether the temperature is above or below 85°. When it is received from the cow, and before it is cooled in the pail, it is more than 90°. It should be set when it has cooled to 85°, and that, if possible without the addition of any milk artificially heated to bring it to the proper standard. The colouring matter and the rennet are then added, and particular care is taken that the rennet is old, yet free from unpleasant smell.* The tub is now covered until the curd is formed.

The process of cutting and breaking the curd follows next; and when it is sufficiently broken it is put into the vats, and pressed well down. The vats are filled as closely as possible—the cheese-cloth placed over all, and a little hot water is poured over the cloth, to harden the outside of the cheese; the curd is then turned out into the cloth, and this being carefully folded round it, the cheese is returned once more into the vat. All the vats which are to be filled are placed one upon another, and all subjected to the action of the press. Here they remain four-and-twenty hours: the vats of the next meal being placed underneath, and those of the preceding meal raised a tier, and dry cloths occasionally applied.

In many dairies there is a second breaking of the curd, which, after having been reduced as small as possible, is scalded with a mixture of water and whey. This second and more perfect breaking down of the curd has been imagined to be the grand cause of the soft uniform substance of the cheese when it is fully made. The practice, however, is getting somewhat into disuse; for it is very reasonably urged that this scalding and washing must extract a portion of the oleaginous part of the cheese; therefore a great deal more care is taken in sufficiently reducing it with the knife rapidly worked about the tub before the curd is put into the vat. The old farmers, however, yet maintain that the whole art of making Gloucester cheese depends on this scalding process; that the fatty matter of the milk and curd is thus disposed to develope itself, and to be brought so far out, as to form afterwards the uniform rich substance for which the Gloucester cheese is celebrated.

At the expiration of twenty-four hours the cheeses are well rubbed with salt. This is repeated daily, for three days, for the single, and four days for the double Gloucester;† the cloths being now taken away, and the cheeses regularly returned to the press for four, or five, or six days, according to the state of the weather. They are then put upon the shelf, or 'tack,' and turned twice in the day, for two or three days; and then placed in the cheese-room, where they are turned once in the day for a month. They are then scraped clean, and painted red or brown, or a mixture of both. After a few days the paint is rubbed off from the edges, and the cheese is continued to be turned once or twice every week.

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* Dr. Rudge says, that the rennet is sometimes made two months before it is wanted. To twelve gallons of water are usually added twelve pounds of common salt, and one pound of bay-salt. This is boiled until it will bear an egg. It is strained when cool, and twenty-four Irish 'vells' or stomachs, and twelve lemons with the rinds on, but incisions made into them, and two ounces of cloves and cinnamon, are then put into the liquor.

† The 'Single Gloucester' is the skim-milk cheese, the 'Double Gloucester,' or 'best making' cheese is manufactured from the pure or unskimmed milk; although it is not unusual in a large dairy to set aside sufficient milk to afford cream and butter enough for the family, and afterwards to add it to the next day's milking. These are sometimes called 'Coward' cheeses; they are either thin, weighing about 16lbs. per cheese, or thick, averaging from 30lbs. to 40lbs.

The best 'Single Gloucester' is either the 'two-meal-cheese,' made of equal portions of unskimmed and skimmed milk, or sometimes two portions of skimmed milk, and one part of pure or 'coward' milk. The inferior cheese, acknowledged to be the skim-cheese, is what its name imports it to be; and the dairymaid usually skims it often enough before she converts it into curd.

In some dairies the floor of the cheese-room is well rubbed with a variety of herbs, among which are elder-leaves, potato-stalks, mint, &c. This is supposed to answer the double purpose of giving the cheese a coat, and also preventing the 'mints' or mites from getting into it. Others not only avoid this unclean practice, but wash the new-made cheeses with hot whey once a fortnight. This is said to give a firmer coat; at least, it gives a cleaner one.

There is nothing very peculiar in all this process, except the more than usually slight agitation of the milk before it is set with the rennet, and the great care with regard to the degree of temperature. Something, perhaps, may be attributed to a less degree of squeezing with the hand in bruising the curd, when a great deal of the fatty matter of the cheese may be pressed out, the knife being more used than the hand in dividing it.

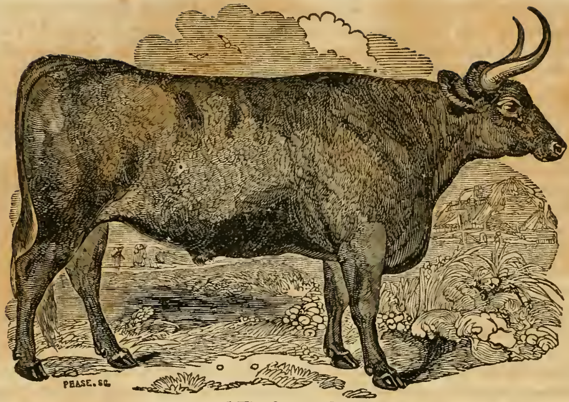
The principal characteristics of the Gloucester cheese are its richness, and its smooth and oily texture instead of breaking when cut, and its retaining fatty matter so perfectly in the operation of toasting.

We have already related the manner in which *Cheddar cheese* is made to resemble the *double Gloucester*.

A little before Michaelmas the cheese is submitted to the factor, who often adopts a very summary way of examining it. He treads upon each cheese, and those which yield to the tread he condemns as 'heaved' or 'hoved,' and are kept for home, or, at least, for country consumption. Many causes have been assigned for this 'heaving.' Some attribute it to the pasture. It is said to have been too luxuriant, or to have had too many early plants in it. The dairymaid always stoutly maintains this. Others, with more justice, say that it is the fault of the maker:—the curd was produced too quickly, either by making the milk too hot, or adding too much rennet, or by removing the cheese too soon to a close and hot room. The cheese-rooms are generally far too hot, and probably encourage this fermentation in the new-made cheese. They should be as cool and airy as possible. Some farmers prefer a stone floor for it, and with reason. The chief cause, however, is to be sought for in the first making.

As may be supposed, the grazing of cattle is comparatively neglected in this dairy district. Some of the farmers, however, buy in small Welsh beasts, principally heifers, 'burries,' and turn them on the *rouen* in August. They remain there until the following spring, being occasionally supplied with hay, as the season may demand, and are then in good condition, and yield a fair remunerating price.

In the neighbourhood of Gloucester, however, a considerable number of oxen, principally of the Hereford breed, are fattened. If in poor condition they are bought in the spring, and, after running on the summer pastures until winter, are finished off in the stall. A more unprofitable way is to buy them in forward condition in the autumn, and feed them on hay with oil-cakes. Some from the lower part of the country are sent to Bristol or Bath; but the greater part of them are destined for the Smithfield market.



[*The Sussex Ox*]

SUSSEX.

Some of the ancient Britons sought refuge from the attacks of their invaders, amid the fastnesses of the Weald of East Sussex. Thither they drove, or there they found, some of the native cattle of the country; and, as in the north of Devon, and, as will be presently seen, in the mountains of Wales, and the Highlands of Scotland, they anxiously preserved them free from all admixture, as relics of happier times, and records of what Britain once possessed.

The resemblance between the Sussex and the Devon oxen is very great. They unquestionably betray the same origin. Lord Sheffield thought that there were two breeds of Sussex cattle; one the larger and coarser, scarcely different from the Hereford, except that they had no white about them, and which were a mixture of the old Sussex with other breeds from the east and the west, and which having been fed on richer pasture, had acquired a larger growth: the lighter breed bore about it unequivocal marks of its being of the same common stock as the Devon.

One of the best descriptions that we have of the Sussex ox is given by that excellent agriculturist Mr. Ellman, of Glynde, to whom the eastern part of that county is much indebted for the preservation of its native breed of cattle, and the great improvement of the South-Down sheep. He speaks of the Sussex ox as having a small and well formed head; and so it has, compared with many other breeds, and even with the Hereford but evidently coarser than that of the Devon; the horns pushing forwards a little, and then turning upwards, thin, tapering and long—not so as to confound this breed with the *long horns*, and yet in some cases a little approaching to them. The eye is full, large, and mild in the ox; but with some degree of unquietness in the cow. The throat clean; and the neck, compared with either the long horns or the short ones, long and thin, yet evidently coarser than that of the Devon.

At the shoulder is the main point of difference, and the principal defect in the Sussex cattle. There is more wideness and roundness on the withers—it is a straighter line from the summit of the withers towards the back—there is no projecting point of the shoulder when the animal is looked at from behind, but the whole of the fore-quarter is thickly covered with flesh, giving too much weight to the coarser and less profitable parts.* This is certainly a defect, but it is counterbalanced by many admirable points. If there is more weight in front, the fore legs are necessarily wider apart, straighter and more perpendicular than in the Devon; they are placed more under the body rather than seeming to be attached to the sides. The fore-arm is large and muscular, but the legs, although coarser than those of the Devon, are small and fine downwards, and particularly below the fetlock. The barrel is round and deep—the back straight—no rising spinal processes are to be seen, but rather a central depression; and the line of the back, if broken, is only done so by a lump of fat rising between the hips. The belly and flank are capacious—there is room before for the heart and lungs to prepare and circulate the blood, and there is room behind, in the capacious belly, for the full development of all the organs of digestion; yet the beast is well ribbed home, the space between the last rib and the hip-bone is often very small, and there is no hanging heaviness of the belly or flank. The loins of the Sussex ox are wide; the hip-bone does not rise high, nor is it ragged externally; but it is large and spread out, and the space between the hips is well filled up.

The tail, which is fine and thin, is set on lower than in the Devon, yet the rump is nearly as straight, for the deficiency is supplied by a mass of flesh and fat swelling above. The hind quarters are cleanly made, and if the thighs appear to be straight without, there is plenty of fulness within.

The Sussex ox holds an intermediate place between the Devon and the Hereford, with all the activity of the first, and the strength of the second, and the propensity to fatten, and the beautiful, fine grained flesh of both. Experience has shown that it possesses as many of the good qualities of both as can be combined in one frame. The Devons and the Herefords are said by some to have been improved by one judicious cross with the other; but a cross with the Hereford often produces, in the Sussex a heavier animal, it is true, yet not fattening so profitably, or working so kindly. Some graziers, however, have very ingeniously explained this, by the different parts on which the Hereford and Sussex cattle usually carry their fat. The Hereford bears it upon the ribs and the sirloin; the Sussex more on the flank and the inside. There may be some truth in this: yet it cannot be denied that the Hereford carry theirs in the best places; and it is on this account that the prize is so often adjudged to them at the cattle-shows, and particularly at Smithfield. When the Sussex has been crossed with the Devon a lighter breed has resulted, but not gaining in activity, while it is materially deteriorated in its grazing properties.

The Sussex ox is of a deep chestnut-red—some, however, prefer a blood-bay: much deviation from these colours generally indicates some stain in the breed. The black, or black and white, which is sometimes met with, generally indicates a cross from the Welsh. The white may possibly remind us more of the original wild breed; a few of which, as we have remarked, remain at Chillingham, and which we shall also trace in other parts. It would be satisfactory if we could discover the origin of these red breeds, for we suspect they were not always so. Mr. Davis, of Glynde, once had a black ox, with a white face, from a red cow by a red bull. A few approach to a yellow colour, but they are weakly and apt to scour.

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* Mr. W. Pitt, the author of some of the Agricultural Surveys, pronounces this breed to be comparatively much inferior to a good selection from the Lancashire, Hereford, or Shropshire breeds; and he says, 'I cannot help thinking them, on comparison with some other breeds, though a weighty, yet an uncouth and coarse animal.' On this the Rev. A. Young very properly remarks, 'There is no knowing what is meant by such expressions as that Sussex oxen are uncouth and coarse animals. If it implies a coarse and thick and rough hide, or a hard and coarse-grained flesh, nothing was ever further removed from fact than such an assertion. Sussex oxen are as remarkable for the fineness of their hides as they are for the closeness and delicacy of their flesh. In his own Staffordshire long-horns, there does not exist any shadow of comparison for feeding, grazing, or working. In quality of flesh, thriving disposition, &c., both the Sussex and Devons exceed you, and Hereford leaves you far behind.'—*Survey of Sussex.*

The hide of the true Sussex is soft and mellow; a coarse, harsh, thick hide is supposed to denote here, as in every other district, an ill-bred, or an unthrifty beast. The coat is short and sleek. There is seldom found on the Sussex ox that profusion of soft and wavy, and, occasionally, long hair, which, although it may have an appearance of roughness, is consistent with a mellow and yielding hide, and one of the truest indications of more than usual propensity to fatten.

In order fairly to estimate the working properties of the Sussex ox, the two breeds of which Lord Sheffield has spoken must not be forgotten; and the confounding of them has given rise to much of the confusion and contradiction which exist in the accounts of several writers.

The proportion of the labour performed by oxen is different in different parts of the county. About the South Downs, oxen are much employed but not perhaps, in an equal degree to horses. In the weald of Sussex, they have the greater share of the labour; and on a farm of about 100 acres there is usually a horse and an ox team—on a larger farm there are more oxen. Many farms of 150 or 200 acres have from ten to twelve working oxen. These have grass and straw until they begin to work, and then cut hay is mixed with their straw.

The coarser breed is always slow, and soon after six years old it can scarcely be worked at all with advantage, The lighter breed, the true Sussex of many a century, will step out as light and as fast, and will do almost as much work as any horse, and stand as many or more dead pulls. Some teams have been known to travel fifteen miles a day, with heavy loads for several successive weeks, and without the slightest distress.

Of the speed which some of them possess proof was given when a Sussex ox ran four miles against time over the Lewes race-course, and accomplished the distance in sixteen minutes. Formerly, as many as four pairs of oxen were not unfrequently seen attached to a single plough or waggon, and they certainly used to pull well together; but they who understand the power and the honesty of these animals rarely attach more than two pairs. Some of them have been worked, and particularly by Lord Sheffield, harnessed in every respect like horses, and they answered as truly and as easily to the rein.

Some have used spayed heifers both for the plough and for draught with manifest advantage. Many farmers keep their oxen as long as they continue to do their work well, and sometimes until they are twelve years old, and they maintain that the beasts will then fatten quite as well as at an earlier age. Lord Sheffield fattened two of more than twelve years, to the great weight of 210 stones. Experience, however, does not confirm this as a general rule. An old ox takes longer to fatten than a younger one; and after all there is generally a patchiness and unevenness about him, which do not please the eye, or answer in the market. Other farmers work them during a much shorter period; and they believe that if they have ten oxen or heifers at work on their farm, the most profitable plan is to sell off five or six every year, and break in an equal number to succeed them. The beasts will thus be broken in at three years old—worked until five or six, and then fattened, and if they do not always grow to so large a size, they improve more rapidly and profitably.

Although it is yet an undecided point at what age an ox that has been worked will fatten most speedily and kindly, it cannot be denied, that he never is in so good condition for work, and never so healthy, or so little troublesome as at six years' old. So far as their work is concerned, we should prefer a nine or ten-year-old ox, to any four, or five-year-old one. The youngsters are often a great plague to their owners, not only in the breaking in, and especially if, as upon this plan, five or six are to be added to the team every year; but like the young horse, they are too frequently ailing—they are injured by their work, or the diseases to which they would otherwise be subject are increased by their work.

The general practice of the county, undoubtedly, is to turn the oxen off at six, and slaughter them at seven; but we are inclined to doubt the propriety of it. The system of recruiting the team so frequently has many inconveniences. Mr. Young tells us that Lord Egremont had a pair of Sussex oxen in the eleventh year of their age, which for seven years had done as much ploughing and carting as any two horses in the county; and then, with half a summer's grass after having been taken from the collar, and an autumn's *rouen*, they were, without other food, sent to Smithfield, and sold for eighty guineas.

The oxen are usually drafted from the team when the spring-sowing is over; they are then turned into the lower or marsh land, in the proportion of one ox to an acre, if the land is tolerably good, and are there prepared for the winter stall-feeding. Sheep are generally mingled with the oxen. In the level of Pevensey, where there is plenty of water, and the grass is abundant, there are many cattle, although sheep are even there increasing; but at Winchelsea and Rye, there are most sheep, and only one bullock to every four acres, in order to keep the pasture even. After the hay is cut and carried, the pastures are usually occupied by cattle and sheep; but the reservation of rouen for the pinching part of the spring when all artificial provender fails, or before the young clover and other grasses have begun to shoot, is comparatively unknown.

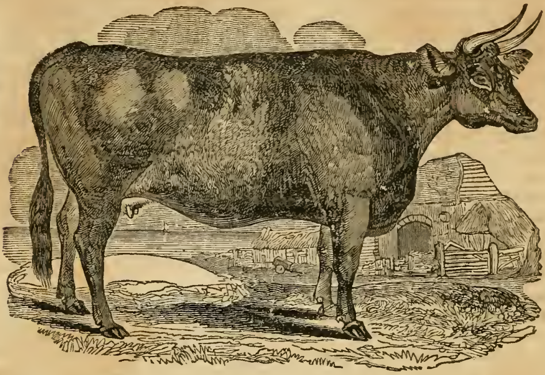
Stall-feeding is very much practised in Sussex, and Lord Egremont used to have his milch cows tied up during the greater part of the year. He maintained, that one-third of the food, was saved—that the cows were fed with a fourth part of the usual trouble—that more dung was made—and that there was no poaching the ground.

The oxen are gradually accustomed to their stalls; they are at first brought in only at night; but, as the winter approaches, they are constantly tied up. Comparing even the system of yard-feeding with the fattening in stalls, Mr. Ellman, of Glynde (a skilful as well as zealous agriculturist, and whose opinion is of weight in cases like these,) found that nine oxen, fed loose in the yard, consumed, in destroying as well as eating, as much as twelve oxen that were tied up. Many graziers, however, and particularly in the midland districts, maintain that an ox loose in the yard will fatten quicker than one that is tied up.

The average weight of the Sussex cattle when brought to Smithfield is about 120 stones; but they have been slaughtered as high as 216 stones. One belonging to Mr. Ellman, weighing 214 stones, measured from the crown of the head to the rump, 9 feet 6 inches. The girth before the shoulder was 9 feet 5 inches; behind the shoulder, 9 feet; round the middle, 10 feet; round the flank, 9 feet; and from the nostril to the tip of of the tail, was a distance of 14 feet 8 inches.

Mr. Edsaw, of Fettleworth, who was partial to large cattle, has had them 6 feet high behind, and 5½ feet before, and10½ feet girth over the heart. Two of them weighed 216 stones each.

The Sussex cow, like the Hereford one, is very inferior to the ox; she seems to be almost another kind of animal. The breeder has endeavoured, but with comparatively little success, to give to the heifer the same points that the ox possesses.



[*The Sussex Cow.*]

The Rev. A. Young thus describes what the Sussex cow ought to be, and some may be found to resemble the portrait:—'The true cow has a deep red colour, the hair fine, and the skin mellow, thin and soft; a small head, a fine horn, thin clean and transparent, which should run out horizontally, and afterwards turn up at the tips; the neck very thin and clean made; a small leg; a straight top and bottom, with round and springing ribs; thick chine; loin, hips, and rump wide; shoulder flat—but the projection of the point of the shoulder is not liked, as the cattle subject to this defect are usually coarse; the legs should be rather short; carcass large; the tail should be level with the rump: a ridged back-bone, thin and hollow chines, are great defects in this breed.'

The Sussex cow does not answer for the dairy. Although her milk is of very good quality, it is so inferior in quantity to that of the Holderness or the Suffolk, that she is little regarded for the making of butter or cheese. Almost every mongrel breed finds its way into the dairy in preference to her. A cross, however, has been attempted, and with some success, between the Sussex and the Suffolk, retaining to a very fair degree the fattenning properties of the one, and the disposition of the other to give a considerable quantity of good milk.

Old Herbert says, that ' while the Sussex oxen carry too much weight on their coarser parts, the heifers and cows are better made and carry much of their weight on their backs;' and he affirms that ' they are sure breeders, good at the pail, and handsome.' The cow is lighter before, but she is deficient in other points; and as to her being good at the pail, the fact that so few of them are kept as dairy cows, even in Sussex, is a sufficient proof that they are not so.

There are some exceptions, however, to this. Lord Hampden, of Glynde, had a cow which, in the height of the season, yielded ten pounds of butter and twelve pounds of cheese every week, and yet her quantity of milk rarely exceeded 5 gallons per day. The next year the same cow gave 9½ lbs. of butter per week for several weeks, and then for the rest of the summer 8lbs., or 8½ lbs., per week: and until the hard frost set in, 7lbs.,—and 4lbs. per week during the frost. Yet as a proof of the quality of the milk, she at no time gave more than five gallons in the day. Mr. Young adds to this, that 'four or five years before, the same person had a fine black Sussex cow from Lord Gage, which also gave, in the height of the season, five gallons per day, but no more than 5lbs. of butter were ever made from it.' This is accounted for in a singular way; for there is a common opinion (a prejudice, we should be disposed to call it) in the east of Sussex, that 'the milk of a black cow never gives so much butter as that of a red one.'

It must be confessed that there is one great fault about the Sussex cows, seemingly inconsistent with their propensity to fatten, and which cannot be remedied. Their very countenance indicates an unquiet temper: and they are often restless and dissatisfied, prowling about the hedge-rows, and endeavouring to break pasture, and especially if they are taken from the farm on which they were bred.

They are principally kept as breeders, all the use being made of them at the same time as dairy cows of which circumstances will admit. And it cannot be denied that they are generally in fair condition, even while they are milking; and that no beasts, except their kindred, the Devons and the Herefords, will thrive so speedily after they are dried. The secretion of milk being stopped, the Sussex cow will fatten even quicker than the ox. It must, however, be acknowledged that the Sussex cows are not perfect, even as breeders; and that, unless a great deal of care is taken that the cow shall not be in too good condition at the time of calving, she is subject to puerperal fever, or 'dropping;' while many a calf is lost from the too stimulating quality of her milk.

Next to the cross with the Suffolk for the improvement of the milk is that with the Jersey, or French cow; but there can scarcely be said to be a decided breed for the dairy in any part of Sussex.

Nearly all the calves are reared—the males for work, and the females for breeding or early fattening. The following is a fair specimen of the breeding and grazing department of an ordinary East Sussex farm. A farm is selected, on which eight cows, on the average, are kept; then it is supposed that there will generally be six calves, six yearlings, six two-year olds, four three-year-olds beginning to work, four four-year-olds, four five year, and four six-year olds. On some farms the calves are calculated as being, occasional losses excepted, equal to the number of cows, and the females are quite sufficient to keep up the stock. The calves are generally cut at seven weeks old; they are permitted to suck for ten or thirteen weeks, and are weaned by being shut up, and having a little grass given to them until they have forgotten the dam, when they are turned out. During the first winter they are fed with the best hay, and after that they have grass; and occasionally somestraw, until the second Christmas is passed, when they are broken in for working. A good cow, after her own calf has been weaned, will suckle another, and sometimes even two others, for the butcher.

Mr. Young gives the following as Lord Egremont's cattle system for work:—'The calves are dropped from December to the end of February. They are weaned immediately, never letting them suck at all; but the milk is given for three days as it comes from the cow. For weaning on skim-milk they ought to fall about December, and then they should be kept warm by housing, and thus they will be equally forward with calves dropped late in the spring that run with the cow. With the skim-milk some oatmeal is given, but not until two months old, and then only because the number of calves is too great for the quantity of milk. Water and oatmeal are afterwards mixed with it. A heifer, however, with her first calf is supposed to suckle it the whole season, in order to make her a good milker; but with the second calf she is treated like the rest. In May they are turned to grass. During the first winter they are fed upon *rouen.* The following summer they are at grass; the second winter out at straw, of which they eat very little, as they run out on short rough grass. They have been tried on hay alone, but straw and grass do better. The following summer they are fed on grass, and are broken in at Christmas, being three years old. They are at first lightly worked; for the only object is to break them in, in order that their regular work may begin in the spring. From that time their winter food is straw, with the addition of a ton and a half of clover hay, given between the finishing of straw and going to grass, and in order to prepare them for the spring sowing. They are worked about four years and a half, and then fattened.'

When at straw in the winter they work three days in the week, and some of them every day. Mr. Young adds a remark which may deserve consideration; that when an ox will not bear hard work and hard food, he should be put to fatten, and, probably, he will thrive as well as one that would stand work and hardship better, for the qualities of fattening well, and bearing hard work, are distinct.

The bull is changed every two years by the best breeders, from the supposition that the breeding *in and in* will cause the stock to degenerate.

The system of working in collars instead of yokes was once very prevalent in Sussex; but experience has not shown that it is decidedly superior to the old method of yoking them to the ploughs.

In some parts of Sussex there is a breed of black cattle, said to have been introduced by Mr. Marten of Tirle. They are probably a cross of the Sussex cow with a South Wales bull, and they retain a great deal of the shape and form of the best blood of Sussex. They are as heavy, and work well; but they are exceedingly troublesome to break in.

Of the west of Sussex, little can be said with regard to any prevailing breed. Mr. James Hack, who resides in the neighbourhood of Chichester, and to whom we are indebted for some excellent remarks, fattens some Devons; but he prefers the Pembrokeshire black oxen, for they are heavier in flesh, more hardy, and can better endure every variation of temperature. Mr. Postlethwaite, of the same neighbourhood, describes the dairy cows as consisting of a strange mixture of short-horns, Devons, Sussex, and French. Mr. Henry Freeland, of Appledram, near Chichester, prefers a cross of the Sussex with the Suffolk polls for the pail.

KENT.

In the western part, or the weald of Kent, the Sussex oxen are much used for the plough and for the road; but there, as in Sussex, the dairy cattle are drawn from other counties. They are principally Welsh, or a strange and varying mixture of the Sussex, the Staffordshire, and the Welsh. Even in the Weald, the Sussex cattle are, with very few exceptions, kept only for the purpose of grazing. Their young cattle, of whatever kind, are usually sent to Romney Marsh in the summer. The farmer in the Weald would not know what to do with his bullocks at that time of the year, because most of his pasture must be reserved for hay, or food for his dairy. They are sent about the middle of May, and return at the end of September, when they are put on the inferior grass lands; and in winter they are sent to the straw-yard, or served with hay in the field. On the other hand, the Romney Marsh graziers send the greater part of their lambs to the Weald for the winter. They go in September, and are brought back in April. This interchange of stock is convenient and profitable for both parties. The Weald farmer keeps the lambs about thirty weeks, and the Marsh farmer grazes the cattle during twenty weeks.

At three years old the heifer, and the steer at four years old, is ready to fatten. Better food is then allowed them. They are kept on the best grass and hay that the farm can afford. The hay of the old meadows is generally reserved for the fattening of cattle. Of those that are kept at home, the pastures are first stocked with milch cows, to take off the head-grass, and the leaner cattle and the working oxen follow them; and thus several fields are fed down in succession during the summer.

The practice of fattening cattle with distillers' wash commenced at Bromley: it was afterwards adopted in the distilleries of Middlesex, of which we shall give a particular account in the proper place.

So far as cattle, however, are concerned, Kent can scarcely be said to be either a breeding or a dairy county. In the east of Kent especially, few cattle are bred. The polled Scots are bought for summer-grazing, or the Welsh are purchased at Canterbury, or other markets. The principal dairy cows are selected from them; the rest are kept in the farm-yard for the winter, and in the spring are placed among the sheep, where they fatten rapidly, and reach from twenty to twenty-two scores.

Some graziers buy Welsh calves in the autumn, and put them out to keep in the farm-yards for the winter: in the spring they place them among their sheep, where they get fat in a few months, and weigh from 18 to 22 scores.

In some parts of Kent oxen are stall-fed on oil-cake and hay, for the purpose of supplying manure for the hop-grounds. This purpose may probably be answered, in regard to the manure, but the fattening of the ox in this way must be far from profitable.

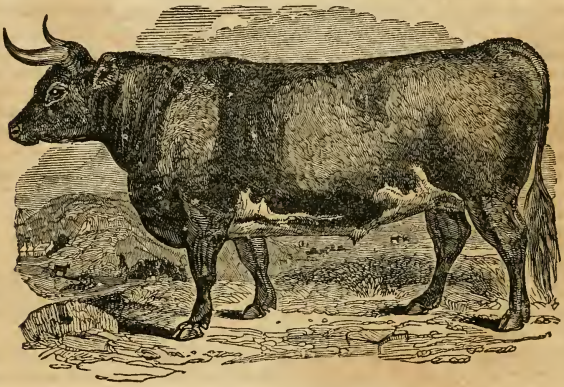
There are very few dairy-farms in any part of Kent; sufficient pasture-land, to keep a few cows to supply the family with milk and butter, and perhaps a little fresh butter for sale, is all that the best upland farms will yield.

The native cattle of Kent deserve more attention than has been hitherto paid to them. Mr. Boys says, that 'they are of a deep-red colour, with small bone, and a kindly-soft skin. They have a great breadth of loin and length of sirloin and rump, and a small head and neck; the horns short and standing upwards, and they have a ready disposition to fatten.'

WALES.

To the Principality we naturally look for some trace of the native breed of cattle, for the Welsh were never entirely subdued by any of the early invaders. The Romans possessed merely a portion of that country; the Saxons scarcely penetrated at all into Wales, or not beyond the county of Monmouth; the Welsh long resisted the superior power of the English under the Norman kings; and it was not until late in the thirteenth century that the Principality was annexed to the crown of England. We therefore expect to find more decided specimens of the native productions of our island: nor are we altogether disappointed. Howell Dha, or Howell the Good, describes some of the Welsh cattle in the tenth century, as being 'white with red ears,' resembling the wild cattle of Chillingham Castle. An early record speaks of a hundred white cows with red ears being demanded as a compensation for certain offences against the Princes both of North and South Wales. If the cattle were *of a dark or black colour*, 150 *were to be presented.* When the Cambrian Princes did homage to the King of England, the same number of cattle, and of the same description, were rendered in acknowledgment of sovereignty. Speed tells us that Maud de Breos, in order to appease King John, whom her husband had offended, sent to his Queen a present from Brecknockshire of 400 cows and a bull, all white and with red ears. Whether this was the usual colour of the ancient breed of Welsh and British cattle, or a rare variety, esteemed on account of its beauty, and chiefly preserved in the parks of the nobles, we are unable to determine. The latter is the most probable supposition; and the same records that describe the 'white cattle with red ears,' speak also of the 'dark or black-coloured breed,' which now exists, and which is general throughout the principality.

The principal and the most valuable portion of the cattle of Wales are middle horns. They are indeed stunted in their growth, from the scanty food which their mountains yield, but they bear about them, in miniature, many of the points of the Devon, Sussex, and Hereford cattle. We will first consider the cattle of South Wales.



[*The Pembroke Ox.*]

SOUTH WALES.

PEMBROKESHIRE.

Great Britain does not afford a more useful animal than the Pembroke cow or ox. It is black; the great majority of them are entirely so; a few have white faces, or a little white about the tail, or the udders; and the horns are white. The latter turn up in a way characteristic of the breed, and indeed the general form of the cattle undeniably betrays their early origin. They are shorter legged than most of the Welsh breeds, but longer than the Montgomeries, and have round and deep carcasses. They have a peculiarly lively look and good eye. The hair is rough, but short, and the hide is not thick. The bones, although not so small as in the improved long horns, are far from large; and the Pembrokeshire cattle mingle to a considerable degree, and as far perhaps as they can be combined, the two opposite qualities, of being very fair milkers, with a propensity to fatten. The meat is generally beautifully marbled. It is equal to that of the Scotch cattle, and some epicures prefer it. They thrive in every situation. They will live where others starve, and they will rapidly outstrip most others when they have plenty of good pasture. The Glamorgans would probably get the start of the Pembrokes on good pasture; but on the rough and barren tracts, which are to be found in both counties, the Pembrokes would decidedly obtain the advantage, and are, therefore, purchased by many of the Glamorganshire farmers. The Pembroke cow has been called the poor man's cow: it is perhaps one of the best cottager's cows, while it is equally profitable to the larger farmer. We shall see, when we come to describe the Anglesey breed, that the original cattle of North and south Wales are essentially the same; they are, however, finer in the head, neck, and breast, than the Anglesey beasts, but not so fine as the Glamorganshire cattle.

The Pembrokes are found in Carmarthenshire, Cardigan, and Brecon, and, indeed, in every bordering county mixed with the different breeds of each, and imparting to each its very best qualities. They bear no slight resemblance to the Kyloes.

The Pembroke ox is, like the Devon, a speedy and an honest worker—fit for the road as well as the plough—and when taken from work fattening as speedily as he does. He is not quite so tractable as the Glamorgan, but easily managed if no foolish violence is resorted to. Great numbers of them are brought to the London market—they stand their journey well and find a ready sale, for they rarely disappoint the butcher; but, on the contrary, prove better than appearance and touch indicated. The Pembroke oxen get rid of their steer like appearance sooner than most other cattle. At three years old they have generally the true character of the ox about them; and in their fourth year, they are usually ready for the market. The Pembrokeshire cow is usually black, with occasionally a dark brown, or less frequently, a white face, or a white line along the back. Mr. Davies describes her as being 'fine-boned, with a clean light neck and head, small yellow horns inclining upwards, good chine and loin, round long barrel, thin thigh and short legs: she is always in good condition if tolerably kept, and has a rich wave in her hair, and an oiliness of skin, which ever denote thriftiness.' This is true with regard to some of the best cows, but there are many exceptions. With all these good points, proving her value as a grazing animal, the Pembroke cow is, as we have described, a very fair milker, and will yield 5lbs. of butter per week during the dairy season.

GLAMORGANSHIRE.

The Glamorgans were once in high repute, and deservedly so. George III., who was a good judge of cattle, was very partial to them, and one of his agents yearly visited Glamorganshire, to keep up his Majesty's stock by a selection of the best cattle that county could produce; and the farm at Windsor is still frequently recruited from this district. For the most valuable portion of the following account of their early history and present state we are chiefly indebted to Mr. Moggridge, of Newport, and Mr. David, of Radyr. To the latter gentleman, whose tact and skill as a breeder need no eulogy of ours, and whose side-board is loaded with the testimonies of the superiority of his cattle, we acknowledge peculiar obligation. We have also extracted some useful matter from Davis's excellent 'Survey of South Wales,' a very rare book, and completely out of print.

D. T., the Welsh topographer, who wrote in the Cambrian language in 1720, speaks of the cows as being large, some red and some pied, with a sleek coat and a fine head. Although we have traced the white ox with red ears to Glamorgan, and the neighbouring county, Brecon, yet the old legends agree that the domesticated breed was of a reddish colour, and that they had some of the Norman and Devon blood in them. This is accounted for by some of the chroniclers. A great part of Glamorgan was, in the twelfth century, seized by Robert Fitzhamon and other Norman Knights. Their connexion with their native country did not immediately cease, and they introduced some of the Norman cattle into South Wales. The swelling crest of the Glamorgan ox at once reminds us of the Norman bull. Did they spread from Glamorganshire to Anglesey, the cattle of which island are also recognized by the peculiar swelling of the breast, and lofty bearing of the head; or may we consider this stateliness of appearance as indicative, in both districts, of the native breed?

We are also told that Sir Richard de Grenaville, one of the Knights who divided among them the Lordship of Neath, also possessed the castle of Bideford on the northern coast of Devonshire, and introduced many of the Devon cattle. This we can easily imagine, for in the old red-cow, which we can recollect nearly fifty-years ago, an admixture of Devon blood could not be for a moment mistaken, and it is even yet evident in the horns, the lively countenance, and the deer-like head and neck. The red, however, was then degenerating into brown, and the brown has been gradually darkening from crosses with the Pembroke black. Some of the original reds are to be met with occasionally in the hilly districts, and particularly in the neighbourhood of Aberdare; but the poverty of the soil has much reduced their size. Not a great many years ago there was in the valleys of the Neath and the Towy, a breed of cattle of a light red colour, and with white faces, which were said to have been the ancient stock of the vale of Glamorgan. Although not so large as the brown breed of the vale, they were good milkers, and fattened kindly. They were not, however, always bare, but occasionally crossed with the stunted blacks of the neighbouring parts of Carmarthenshire.

The Glamorganshire farmers, of half a century ago, took great pride in their cattle, and evinced much judgment in their breeding and selection. There was one principle from which they never deviated:—*they admitted of no mixture of foreign blood*, and they produced the Glamorgan ox, so much admired for activity and strength, and aptitude to fatten; and the cow if it did not vie with the best milkers, yielded a good remunerating profit to the dairyman.

They were af a dark-brown colour, with white bellies, and a streak of white along the back from the shoulder to the tail. They had clean heads tapering from the neck and shoulders; long white horns, turning upwards; and a lively countenance. Their dewlaps were small, the hair short, and the coat silky. If there was any fault, it was that the rump, or setting on of the tail, was too high above the level of the back to accord with the modern notions of symmetry.

Forty years ago the breed was eagerly sought after by the most skilful breeders in Leicester, Northampton, Warwick and Wilts. Their aptitude to fatten rendered them exceedingly profitable when taken from the plough at six or seven years old, and they were brought to great perfection on the rich English pastures—frequently weighing more than twenty scores per quarter. The beef was beautifully veined and marbled, the inside of the animal was well lined with tallow, and the Glamorgans commanded the highest price both in the metropolitan and provincial market. Mr. Davies, who wrote in the year 1814, says that 'among the Glamorgan-vale browns good cow-beef weighs from eight to ten score pounds per quarter, although some weigh as much as twelve or thirteen scores. Ox-beef is from twelve to fourteen scores per quarter; some, however, have reached eighteen, and even twenty scores.'

The steers were seldom yoked until three years old; they were then moderately worked for three or four years and well kept; and, after a few weeks' rest, they were usually disposed of at the large spring fairs in this county, which then displayed a collection of fine oxen, not often surpassed in any of the English districts.

During the French revolutionary war the excessive price of corn attracted the attention of the Glamorganshire farmers tō the increased cultivation of it, and a great proportion of the best pastures were turned over by the plough. Turnip-husbandry necessarily followed; and then the improvement of their sheep stock became an object of importance, and the cattle were almost entirely neglected. A proper selection for breeding was unattended to; the calves were generally weaned at two or three weeks old, and nursed on milk and water, hay-tea, and boiled linseed; the produce of the cow being entirely reserved for the dairy. The steers were taken to labour when they were two years old, and seldom exceeded four years when they were disposed of; they were depastured in summer, either on land too wet to carry sheep, or too bare for corn, and in winter they barely existed in the straw-yard.

The natural consequence of inattention and starvation was, that the breed greatly degenerated in its disposition to fatten, and, certainly, with many exceptions, but yet, as their general character, the Glamorganshire cattle became and are flat-sided, sharp in the hip-joints and shoulders, high in the rump, too long in the legs, with thick skins, and a delicate constitution.

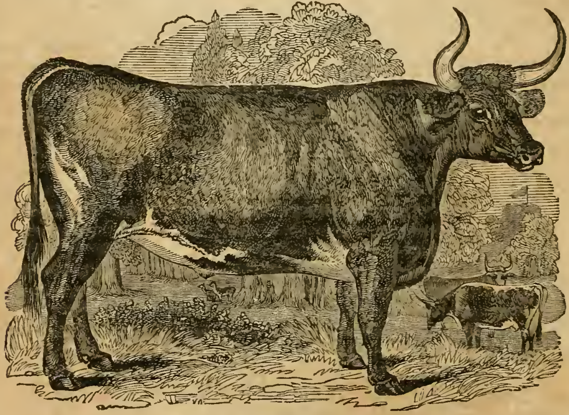
The Glamorganshire farmer was startled at the necessary result of this alteration of system. His cattle, instead of being eagerly sought after, and sold at an extravagant price, could scarcely be sold at all, or only at a serious loss. He was unwilling at first to acknowledge the real cause of this deterioration and diminution of value, and many of the breeders, even at the present day, take little or no pains to redeem their error.

A few spirited individuals, however, set the example; and others have been incited by their zeal and partial success to assist in endeavouring to restore the breed to its former pre-eminence, or, at least, to adapt it to the coarser fare which, under the altered state of husbandry, must now be to a great degree its lot.

Among these, and one of the most skilful and successful of them, was Mr. David, of Radyr, whose sketch of the deterioration and regeneration of the breed we are giving our readers in a somewhat condensed form. The result of these attempts has been, that, in the recent exhibitions of stock at Tredegar, the revived and pure Glamorgans have often successfully competed with the short-horns and the Herefords; and Mr. David has received, at Sir Charles Morgan's cattle shows, no less than twelve silver cups for his Glamorgans.

The work of improvement, however, as yet has been, and could only be, in few hands. It is comparatively easy to keep up a good breed; but to regenerate a bad one, or, at least, a deteriorated one, requires skill, capital, and perseverance; and these called into active requisition in the face of hard times, and with little or no prospect of obtaining remunerating prices. Therefore it must be acknowledged at present, and perhaps it must long continue to be the fact, that the Glamorgans, generally, are far from being what they once were. They continue, however, to maintain their character for stoutness and activity, and are still profitably employed in husbandry work. Only a little while ago four Glamorgan oxen ploughed with ease half an acre of clover hay in two hours and three-quarters. The beef is still good, marbled, and good tasted; and in proportion as the value of the ox to the grazier has decreased, the value of the cow has become enhanced for the dairy. He who is accustomed to cattle will understand the meaning of this; and the kind of incompatibility between an aptitude to fatten in a little time, and on spare keep, and the property of yielding a more than average quantity of milk.

Even Mr. David acknowledges that he had not succeeded to his perfect satisfaction in reproducing the old breed, which combined so much of both these excellences; and therefore he, and the most scientific breeders of the county, began to be weary of this strict adherence to the Glamorganshire breed, and to consider whether it might not be possible, by judicious crossing with the cattle of other districts, to obtain an animal better suited to the present state of the country,

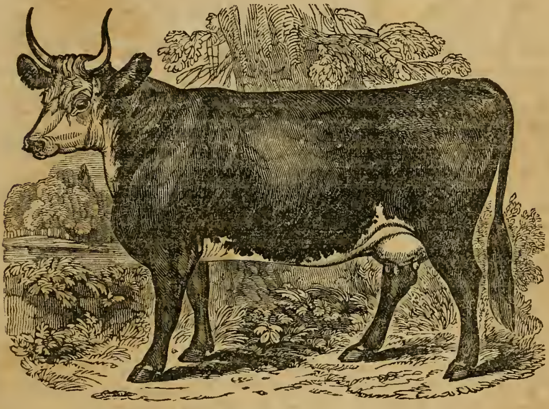


[*The Glamorganshire ox.*]

The interests of the grazier were first considered, and the comparative slowness in feeding in the present Glamorgans was attempted to be obviated by crossing with the Hereford bull. This to a considerable extent succeeded. An animal was produced well adapted for the grazier; disposed to accumulate flesh, and of a hardier constitution: but the ox was a little injured for the yoke; the beef, as is the case with every animal that arrives at an early maturity, was not so fine; and the value of the cow was very much diminished; she was neither so good a milker, nor nurse. Besides this, the fattening of an animal that grew to so great a bulk as the mingled Hereford and Glamorgan, interfered too much with the present economy of Glamorganshire husbandry; and the produce of this cross did not always thrive on the scanty fare on which it was compelled to subsist.

That important, and not duly appreciated fact, to which we shall often have occasion to allude, was also here very apparent. The advantage of mingling the Hereford with the Glamorgan was evident enough in the first cross, and the farmer began to congratulate himself on the result; but after the second and third generation, the influence of the foreign blood rapidly disappeared, and the Glamorgan, with all his characteristic points and defects, again stood before us. The heavy Leicester was likewise tried, but the progeny became sluggish and unfit for labour, and slow in feeding and coarse in beef, and unfit for stocking such a district. The influence of soil and climate on the production, and the perpetuation of certain breeds, is a circumstance that does not enter half so much into the consideration of the farmer as it ought to do, and will account for a great many of his disappointments and erroneous opinions. We shall seriously consider this subject when we come to treat of the principles of breeding.

Breeders then began to take another view of the matter. They considered their cattle as mère machines for converting the raw produce of the earth into human food; and they inquired whether their soil and climate, and situation for markets, and their mode of agriculture, were best adapted for a machine to produce beef, or milk. The character and habits and employment of the inhabitants of Glamorgan had essentially changed. Mines had been sunk, and manufactures had been established in almost every part of the county. It was become a very populous district, in which dairy produce would always command a ready sale. In addition to this, the good old custom still prevailed in this county, of farm-servants being kept under their employer's roof; and their diet, in order to be both wholesome and economical, was chiefly derived from the dairy. As therefore, the old Glamorgan could with so much difficulty, or scarcely at all, be reproduced, the attention of the farmer was gradually directed to the dairy.



[*The Glamorganshire Cow.*]

At first he was unwilling quite to sacrifice the old pride and boast of his native county, and he endeavoured once more to accomplish both objects, and he had recourse to the short-horns. A very little experience, however, convinced him that his labour would here be lost. He retained, indeed, the milk, but he somewhat deteriorated its quality; and the beast was slow and sluggish, and not calculated for labour, and would not thrive on the pasture and on the nourishment which this county usually affords. In a happy hour he thought of the Ayrshire cow; and he brought her from her native district. Some farmers used her pure; others crossed her with the best Glamorgan cattle; and others with still more judgment procured the Ayrshire bull, and bred with him from the best of their own heifers. The result was, an animal that yielded more milk than the old Glamorgan—that was hardier, and could be kept, and especially in the winter, at much less expense, and that from its smaller size was more easily fattened, and better suited to the coarse fare now generally afforded her by the Glamorganshire farmer. This, then, is the breed which is becoming, and profitably so, established in the populous districts of Glamorgan. Among the improvers of the Glamorgan cattle Messrs. Bradley of Treguff must not be forgotten. Their beasts bear a close resemblance to the Herefords in figure, although inferior to them in size; they feed kindly—the flesh and fat are laid equally over them—the beef is beautifully marbled, and they yield a more than average quantity of milk. They are fattened to perfection at five years old, but not often at an earlier age; and will become sufficiently bulky on the good pastures of the vale without any artificial food. In the hilly districts many of the old Glamorgans remain, and attempts are made to restore the character of the pure Glamorgan cattle of fifty years ago, but without that degree of success which will fairly remunerate the farmer.

The cut in the preceding page is the portrait of a valuable cow, belonging to the royal dairy at Windsor, and gives a faithful representation of the present improved breed of Glamorgan dairy-cattle.

The average quantity of milk given by a Glamorganshire cow is about sixteen quarts per day. The principal object of the dairyman is butter, of which the average produce of each cow is at least 1 cwt. during the season. The butter is esteemed; and that which is not consumed in the home-manufactories is usually sent to the Bristol market. The Glamorgan cheese is often of an inferior kind. There used to be, and in some measure there still is, an unpleasant dryness and brittleness about it, depending, according to some persons, on the clover in the natural pastures, but more attributable to some mismanagement in the manufacture, or the quantity of ewe's milk which was mingled with that of the cow.

With the establishment of a dairy breed, it has been thought by some that a little too much of the old false economy in the rearing of the calf has been re-introduced. He is early weaned; frequently in less than a week; always in little more than a fortnight, and after that he is badly sheltered and worse fed—skim milk, and not too much of that, is his only provender. This is not perhaps to be strictly defended, for it is practised on an animal that may be brought to grow to a large size, and whose constitution, although improved, is none of the hardiest; yet, on the other hand, although the calf of the Hereford, or even of the short-horn, is a very superior animal at a year old, it should not be forgotten that he has probably consumed the whole year's produce of the cow, and that at weaning time he must be supported by the most nourishing food; so that when the balance is struck, the profits of the respective breeders may not be very different, especially if two or three cwt. of cheese and butter are added to the value of the Glamorgan yearling.

There is still another serious defect in the system of Glamorganshire breeding: if the calf appears to fatten more than usually kindly, it is forthwith sold to the butcher, and not reserved, as it should be, for the purpose of breeding. In selecting their cattle; the first and almost only consideration has reference to their milking qualities; and a full udder will outweigh every objection which might be made to their flat sides, large offal, long legs, coarse shoulders, and thin skin. In some parts of Glamorganshire the pure Herefords are cultivated in preference to any mixture with the native breed. Mr. Bradley, who resides near Cardiff, is partial to the Herefords, and his stock does not yield to many in the neighbourhood, or in the county ganerally.

The *hilly*, or rather the mountainous district, forms the greater, although not the most populous, part of this county. Mr. Jenkins, of St. y Nill, informs us that, from the retired and attentive habits of the farmers, and especially from the comparatively small part of the county that could be submitted to the plough, the cattle of the hills have, in a great measure, escaped the deterioration of those in the vale. They are browner than those in the vale, well bodied, and with short legs. Few crosses have been attempted among them. They are hardier than those in the vale, and advantage is often taken of this to expose them to too much privation. While the *vale*-cattle are wintered, and often badly enough in the straw-yard, the *hill*-cattle have nothing but hay from poor peaty meadows, whose produce is not more than seven or eight cwt. to the acre, and which are rarely or never manured. Notwithstanding this they thrive; their meat is of a superior quality, and they are much sought after in the London market.

The Glamorganshire cattle continue to prevail in Monmouthshire, of which, although not strictly a Welsh county, and far more a mining than a breeding district, it will be convenient next to speak.

MONMOUTHSHIRE.

HERE likewise Mr. Moggridge is our chief authority.

Monmouthshire may be divided into the *hill* and *vale* districts. The cattle of the HILL COUNTRY were probably derived from crosses of the Brecon blacks with the Glamorgans. The latter predominated, and continued so to do, to the visible improvement of the breed.

Within the last few years, however, a great number of Irish cattle have found their way to every part of the Bristol channel by means of steamboats, and they were offered at prices so inferior to that of the natives that they were greedily purchased. Not only, therefore, was all improvement in the Monmouthshire cattle arrested, but the hill-farmers were threatened with ruin, for they could scarcely sell their beasts at any price. If this system is longer pursued, the breeding of the native cattle will be in a manner abandoned.

Some Durhams have been lately introduced into the neighbourhood of Pontypool, but with doubtful success. The Ayrshire cow has found her way into some of the hill-dairies, and is much valued; while great numbers of Scotch cattle are brought into the districts immediately connected with the iron works, and even bred there. They live well on the mountain pastures, and are soon fattened at the end of the season.

Many of the native cattle, however, continue to be fattened in the hill-district, and are thence driven into the richer pasture of the central counties to be finished. They are good milkers, although not equal to the Glamorgans, of whose blood they inherit a considerable portion. Their appearance is very much against them, and they will not thrive rapidly even on good land.

The use of cattle for husbandry has been declining for many years, owing to the canals and railways which intersect the county, and the consequent increased demand for horses: but should the introduction of locomotive engines hereafter banish the horse from the mining districts, the use of cattle in rural affairs may probably be resumed, to the future advantage of the landlord and the tenant, although the present change is operating unfavourably on both.

In the VALE DISTRICT of Monmouthshire the farmers were formerly content with the Glamorgans, and the better kind of hill-cattle; and these after being kept for some time, increased in size and in value. Of late years, however, the Hereford have in a manner superseded both of these breeds, and many fine beasts of that stock are to be found in the vale of Usk generally, and particularly in the neighbourhood of Abergavenny. Some intelligent farmers from Herefordshire have settled in this district. They naturally brought with them their native cattle: and the Herefords, or crosses from them, may now be considered as some of the established breeds through the whole of the vale. Sir Charles Morgan has introduced the Durhams into the lower part of the county, and with a prospect of considerable success. Some of his short-horns, and particularly those exhibited at his cattle-show in 1830, were, as the intelligent judge of the cattle appropriately called them, *tremendously fat*. At what expense they were made so is not perhaps, considered so seriously as it ought to be. For the dairy especially, it is probable that some valuable breeds may arise from crosses between the Durham bull and the best of the vale cows. The Herefords will never find their way into the dairy: they belong to the grazier and the butcher.*

The prevailing cow is the Glamorgan, with some of the middle-sized Gloucester-vale breed.

A great proportion of the labour of the vale husbandry is performed by oxen, but the bye-roads of Monmouthshire, even more neglected and worse than bye-roads generally are, compel the farmer to keep more horses than he otherwise would.

There is a large tract of land comprising many thousand acres, that can neither be called hill nor vale, and is locally known by the name of *the levels*, comprising all the flat land bordering on the Bristol channel. Nearly the whole of this is meadow land, and naturally of very superior quality. The prevailing stock used to be Glamorgans, and they were selected with care and managed with judgment; but during the last few years the pressure of the times has paralysed all enterprise, and the stock of this district is evidently deteriorated. The Irish cattle crossed this tract in the way to the interior, and too many of them loitered here and are becoming in a manner naturalized.

CARMARTHENSHIRE.

THIS county may also be divided into the hill and vale districts, and the breed of cattle in the two is very dissimilar. The hill-breed betrays much

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* Mr. Walker, of Binton, tells us that this is too strongly expressed. It is his opinion that "they want nothing but management to bring them into the dairy. Being so admirably adapted for the grazier, their milk is quite neglected. The Herefordshire farmers want *early calves*, and their cows and heifers calve between the middle of December and February, after living entirely on dry meat, and, therefore, by the time the grass comes, they are nearly or quite dry; but if the Hereford heifer calved for the first time at grass, and about the middle of May, she might become a good milker. Some of the cows will, under the present management, yield from ten to twélve quarts of milk at one time, and their milk is superior to that of any other cow except the Alderney. The quantity of milk given by a cow will greatly depend on her treatment when with her first calf. If she has not proper food to swell the milk veins at first starting, she will never afterwards make a good milker. The Hereford cow has seldom a fair chance here. 'I speak from experience,' he says, 'for I have had much to do with the Herefords for several years, and have always had many good milking cows of that breed.'" These are very important observations; and although we are not sufficiently convinced to alter what we have written, and what almost universal experience and belief confirm, the remarks of Mr. Walker deserve serious attention.

Irish admixture. The cattle are small, but coarse; generally black; and with a length as well as thickness of horn that would better entitle them to a place in our next division, than among the aboriginal middle-horns. They are a hardy race, but never carry much flesh, and are indifferent milkers. They have been much improved by the introduction of bulls and heifers from Pembrokeshire.

The vale-breed is larger. The Glamorgan has found his way here, and the native cattle have been considerably improved. The Shropshire has also been introduced with advantage. The dairies have benefitted by this admixture, and a cross with the Hereford has been attempted with advantage by the grazier. They are now much less used than formerly in husbandry work or on the road, but they were very serviceable. Mr. Davies says that Mr. Gwynne, of Glan Brân Park, bought five three-year-old bullocks in the winter of 1810, and began to work with them immediately, and continued ploughing with them until the barley seed-time was over. They were fed on straw, with some turnips, and when they were worked unusually hard a little hay was allowed. In the summer they went daily eighteen miles for lime. They had then a little respite, but they were worked again at wheat-sowing, and sold in the following January for 5*l.* each more than their prime cost.

The average produce of the Carmarthenshire cow is about 1 cwt. of butter during the dairy season, with nearly double the quantity of cheese. In the vale of the Towy a greater quantity is yielded, when the river overflows its banks in the winter, or early in the spring, for the pastures are then richly manured for the following season. A summer flood, however, materially injures the feeding-grounds, and lessens the produce of the farm.

CARDIGANSHIRE.

The Cardiganshire cattle belong to the Pembroke or Carmarthen breeds, or are a mixture of the two. Mr. Walker says, that the Carmarthen and Cardigan cattle are so much alike that he scarcely knows how to divide them. They are not quick feeders, nor do they ever carry much fat; but the little flesh that they have upon them is very good. They pay more by running upon tolerable land among the sheep, than they would do by any mode of stall-feeding. Mr. Lloyd, in Davies' Survey, more truly says, that they are hardy, work and travel well, and take on fat kindly; but that the best improvement that could be made in the management of them, would be to give them better food in winter.

In speaking of Kent as a grazing county, we have mentioned that a great many Welsh are fattened there. A considerable portion of them are from Cardiganshire; and, for small beef, they find a ready sale in the London market.

The Cardiganshire cows are not to be despised for the dairy. Mr. Lloyd averages the produce of an ordinary cow at 80 lbs. of butter and 160 lbs. of cheese in the season. Other farmers average it at from six to seven score lbs. of butter, with a corresponding quantity of cheese. This computation seems to be the nearest to the truth. The butter is sent to Bristol, or to the iron-works of Glamorgan and Monmouth: the cheese is kept for home consumption.

BRECKNOCKSHIRE.

The usual breed of this county is truer than many of its neighbours to its native origin. The middle-horn may be clearly traced with many of the excellences of that division of cattle. Much cannot be said of the Brecknock breed as milkers; but they are useful and active at the plough, and deservedly valued by the grazier. Recourse has of late years been had to two of the varieties of the middle-horn, the Devon and the Hereford, and with evident advantage both for work and grazing. The cattle on the side of Brecon that is nearest to Herefordshire are, in a particular manner, becoming very strongly mixed with the Herefords.

RADNORSHIRE.

More cattle are probably bred in this county than in any other district in Wales of equal extent, and large droves are sent from the cattle fairs to Oxford, Northampton, Leicester, and even to Romney Marsh. The native breed is the Pembroke, or one that very much resembles it; but, with commendable spirit and industry, the Radnorshire farmers have endeavoured, and successfully, materially to improve it. They have principally had recourse to the Herefords as a cross with their own cattle, and, although they have thus produced a beast, too large, and too capable of yielding beef to be perfected on their poor land, they have obtained one that will thrive and pay everywhere else, and that will consequently find a ready market. The general colour is red, or brindled, and the true white face of the Hereford marks the source whence the improvement in the stock was derived, the red heifer, however, with a dark and smoky face, is most in request for the dairy. The dairy-women began to complain that 'too much *soap* had come into the country,'—that the red had been washed off from the faces of too many of their cattle; for it cannot be denied that, although the Hereford-cross increases the size, and does not diminish the tendency to fatten, it very materially lessens the quantity of milk. With Shropshire on the north, and Herefordshire on the east, they had good materials at command, and they have wisely and diligently used them. It may be truly said that they have got the start of most of their neighbours in the breeding of good cattle. The Radnorshire farmer rarely overstocks his ground, but the cattle have plenty of food both in winter and summer, and on which they rapidly thrive, however coarse it may be. The calves in this county are usually taken from the cow at the expiration of a week or nine days, especially if the farmer wishes the dam to breed again. The young animal is then suckled by the hand with new milk for four or five weeks, when gruel or linseed-tea is gradually substituted, and dry-kneaded pellets of barley, or pease or bean-meal, or vetches are added. Closes of suitable size are appropriated to the calves—the soil being good, and the herbage sweet, and the stubbles being always preferred to the *rouen* after harvest.

NORTH WALES.

Although we have placed the cattle of North Wales in the same chapter as 'the middle-horns,' we confess that we are a little approaching to the next division, 'the long-horns.' There is however a great deal of the character of 'the middle-horns' about them, and marking their common origin, with the exception perhaps of some of the Anglesey oxen; but their peculiar bull-like appearance is to be traced to a practice which we shall presently have to describe. North Wales, considered as a cattle country, may be divided into two districts. In the first the rearing of cattle is almost exclusively attended to; in the second, the dairy is a matter of considerable if not primary regard. The first will include Anglesey, Carnarvon, and Merioneth; and to the second belong the counties of Denbigh, Flint, and Montgomery.

ANGLESEY.

The island of Anglesey, the Mona of ancient times, the peculiar seat of Druidical superstition, and long the rallying point of British independence, is distinguished from the other divisions of North Wales by the absence of an irregular and mountainous surface. It is diversified only by numerous undulations, (they scarcely deserve the name of hills,) covered with grass, although not of a luxuriant nature, and on which a considerable number of cattle are reared. Roberts, who published his Map of Commerce nearly two hundred years ago, says that three thousand head of cattle were annually swum across the straits of Menai. We shall not exaggerate when we say that ten thousand are yearly exported from this island, the aggregate value of which will be, at least, 50,000*l*. The iron bridge of Menai now affords an easier and securer passage; yet the losses, when the cattle were compelled to swim across the strait, were surprisingly few, although the current was rapid and the water was deep, and the yearlings were sometimes swept down the stream even so far as three or four miles.

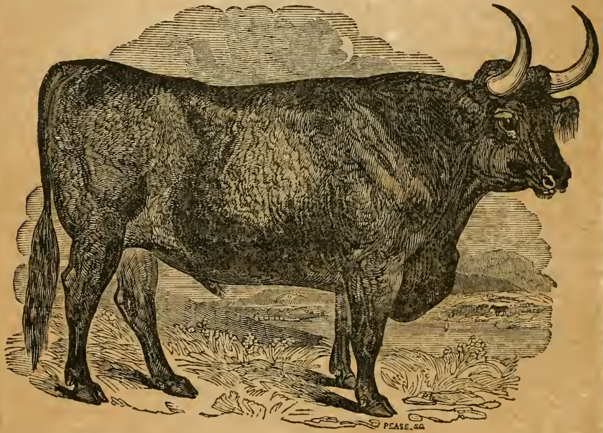
The Anglesey cattle are small and black, with moderate bone, deep chest, rather too heavy shoulders, enormous dewlap, round barrel, high and spreading haunches, the face flat, the horns long, and, characteristic of the breed with which we will still venture to class them, almost invariably turning upward. The hair is apparently coarse, but the hide is mellow; they are hardy, easy to rear, and well-disposed to fatten when transplanted to better pasture than their native isle affords.

The Anglesey calves are not weaned by some of the smaller farmers until a late age. This would be advantageous to the future growth of the beast, were it not more than counterbalanced by the false economy which is practised by the Anglesey housewives during the period of suckling. The young black cattle of this island have little more than hay-tea, and gruel, and the common broth of the house; and when they are weaned, they are, in a manner, totally abandoned. The best treatment they experience is to be folded in an unsheltered yard, with scarcely enough oat and barley straw to keep them from starving; for, from the face of the country and the nature of the soil, there can be but little provision for winter-feeding. This would deteriorate any breed less hardy than that of the Isle of Mona.

Mr. Boggie, of Beaumaris, assures us, that the better kind of farmers give their calves three months' milk, either by allowing the calf to suck, or to have milk from the pail. After being weaned they are turned to good pasture for the summer, and are well housed at night, and have hay morning and evening during the first winter. On the following year they fare the hardest of any part of the cattle-stock, being turned on the poorest pasture in the summer, and foddered on barley and oat straw, and generally in very bleak exposed situations in the winter, for there are few farm-yards in the island. If they are kept another year they are better pastured in the summer, being turned into the next best grass to the cows; and, if kept over the winter, are generally outlayers, and have hay or straw night and morning. Those that get hay are sold in good condition in the spring, and taken to England; those that get straw only are kept until the autumn, when, having had good pasture, they also are got into good store condition, and are purchased for the English Market.

It is the common opinion, and we fear a true one, that the breed of Anglesey cattle, like that of Glamorgan, is somewhat deteriorated. The state of the case is, that the attention of the Anglesey farmer was once strongly directed to the breeding of cattle; copper and cattle were the staple commodities in this island; but when the war that commenced with the French revolution so suddenly and extravagantly raised the price of corn, much of the old pasture-land of Anglesey, like that of Glamorgan, was submitted to the plough. Cattle were then comparatively neglected; the farms were overstocked, in order to furnish the usual number of beasts; the calf was half starved; the yearling was stinted; and the Anglesey runt sunk in estimation and value. The practice of the middling and small farmers, and, indeed, of many of the largest, of selling off their best yearling heifers, and keeping the poorest only for the dairy and breeding, and the culpable and general neglect of selecting good bull-calves, and also the want of proper inclosures by which the steers could be kept from the rest of the stock, contributed to increase the deterioration.

Some judicious, and many ill-judged, experiments were tried, in order to restore the pristine excellence of the breed. Bulls from other districts were introduced; but with little good effect. There were two impediments in the way. It was difficult to find another breed sufficiently hardy to withstand the climate and the privations of Mona; and even if such had been found, there seemed to have been such an identity between the cattle and the climate, that little permanent alteration could be accomplished. The first cross effected an evident change, but the Anglesey blood, like that of the Glamorgans, predominated—the produce bred back, and, after a few generations, we had the Anglesey breed again, scarcely altered, or, if so, for the worse, by being deprived of a portion of its hardihood.



[*The Anglesey Ox.*]

The Anglesey heifer has been crossed with the Lancashire bull, with an evident increase of size, amounting to at least two scores per quarter when three years old, and even an increased propensity to fatten, and that on scanty food; but, generally speaking, the Angleseys have not improved by crossing, and least of all from the Irish cattle, which have been bought in great numbers by the farmers, on account of their being cheaper than their own country beasts.

The breed is again improving; the best specimens have been carefully selected, and dearly bought experience has forced upon the farmer this truth, that it is false economy to starve the growing beast.

The Anglesey cattle are principally destined for grazing. Great numbers of them are purchased in the midland counties, and prepared for metropolitan consumption; and not a few find their way directly to the vicinity of London, in order to be finished for the market. In point of size, they hold an intermediate rank between the English breeds of all kinds and the smaller varieties of Scotch cattle; and so they do in the facility with which they are brought into condition. If they are longer in preparing for the market, they pay more at last; and like the Scots, they thrive where an English beast would starve. Both the Scotch and the Welsh breed have their advocates, and perhaps, upon the whole, the palm in point of profit must be yielded to the inhabitants of the northern kingdom.

In consequence of the overstocking of their land and the dearth of winter provender, the Anglesey breeders are anxious to get rid of their cattle as soon as they can. Many yearlings cross the bridge of Menai; and very few beasts are retained in the island after they are three years old. The three-years old are the most profitable to the English grazier. They are eventually brought to the market from sixty to eighty, and sometimes even a hundred stones, and their meat will always bear a superior price to that of the larger cattle.

In Anglesey, and in the greater part of North Wales, the black cattle were formerly used extensively for the plough, and even on the road; they were docile and hardy; but their use for draught has now nearly ceased. They are strong, active, and willing; but it might be no disadvantage if they were longer in the leg and less deep in the chest. The Anglesey oxen have a peculiarly noble appearance. They were not cut until they were a year old; this gave them a fierce and bull-like form about the head and dewlap, a projection of the breast, and lofty bearing of the head. There is still a stateliness in the gait of an Anglesey ox, and a haughtiness of countenance, which we have not recognized in any other breed. It presents a striking contrast with the mild intelligence of the Devon, and the quiet submission of the Hereford. Early castration, however is now commonly practised and the oxen are getting lighter about the head and dewlap.

Many of the Welsh traditions confirm the early and indeed the exclusive use of oxen for the plough; and Howell the Good condescended to legislate with regard to these useful animals. The account which he gives of the customary length of the yoke would show, however, that the oxen, in those times, were a great deal smaller than we now find them. Whatever number were attached to the plough, (and great strength was required, from their perpendicular manner of forming the ridge, even on the steepest ground,) they were all yoked abreast. The short yoke for two oxen was four Welsh feet, of nine inches each, (three English feet) in length; that for four oxen was eight feet (six English feet) long; and that for eight oxen was sixteen (twelve English feet) long.* An ordinary ox of the present day would require a somewhat larger space than eighteen inches, in order to work or even to stand.

The oxen were not only smaller, but far less numerous than at present, or the land was divided into much smaller portions. Each circumstance, probably was influential in the formation of the *Welsh Ploughing Societies* with regard to which, also, the benevolent Howell legislated. A great many little farmers clubbed together, according to their means, in order to make up a team, which was to plough an acre of land per day. The best acre was given to the maker and conductor of the plough, who was always the same person; the second acre was allotted to the owner of the plough-irons: the third to the owner of the right hand ox; the fourth to that of his yoke mate; the fifth to the driver; then an acre to the owner of each of the other oxen; and the last acre of all to the furnisher of the plough timber.

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* Wotton's Leg. Wal., p. 284. The old Welsh acre consisted of 4320 square yards, being 520 less than the present statute one. The North Wales acre, as now calculated, consists of 3240 square yards, being not quite three-quarters of the statute acre.

No more cows are kept for the dairy, in Anglesey, than are sufficient for the home consumption. Of cheese, little is made, and what is made is often ill-tasted, and of a spongy appearance. The fault of this, however, lies more with the farmer's wife or the dairy maid, than with the cattle, or the soil.

Having given so full a description of the Anglesey cattle, our notices of the other districts of North Wales will be comparatively short.

On the other side of the straits of Menai we find

CARNARVONSHIRE.

This county, with the exception of the promontory of Lleyn at the south west extremity of it, consists of little more than a succession of abrupt rocks, some of them swelling into enormous mountains. It may therefore be supposed that the cattle are small. They may be considered as a variety of the Angleseys, but inferior to them in size and shape. Few attempts to improve them have been made, and those attended by no great success Both the farmers and the drovers obstinately adhere to the native breed; and certainly with this apology, that no others can vie with them in hardiness or be so cheaply reared.

In the promontory of Lleyn the surface is more level, and the breed resembles that of Anglesey, but is, perhaps, a little inferior for the soil is not so rich, nor the pastures so luxuriant. Great numbers of cattle are driven from this district into other parts of Wales, and also into the midland counties of England.

A very few oxen are here worked, but none in the other parts of the county; the extreme irregularity of the surface and the prejudices of the farmers forbidding it. Some good cheese is also made in this part of Carnarvon; but, otherwise, the business of the dairy is completely neglected.

MERIONETHSHIRE.

This county, chiefly devoted to breeding, is situated south-east of Carnarvon skirting St. George's Channel from Carnarvon to Cardiganshire; and is almost as mountainous as Carnarvon. Here likewise, on the hilly ground the cattle are only a smaller variety of the Angleseys, and very inferior to them. They are ill-shaped as well as small, and, in the opinion of Mr. Sharp, of Rhagatt near Corwen, they are some of the worst in Wales. It is the pure Welsh breed, and to which the Merioneth farmers have hitherto pertinaciously adhered; but it stands at the very bottom of the list, for it has been most disgracefully neglected. The Merioneth cattle, however, are capable of material improvement, if attention were paid to the selection of the best of the native breed. It is, after all, the breed best adapted to the situation and climate, and every attempt to render it more valuable by foreign admixture has uniformly failed.

A better breed is found in the vale district, principally devoted to the dairy; and a considerable quantity of good butter is made in the neighbourhood of Bala, and along the whole course of the Dovey. The valley of Dovey affords the richest pasture in the county.

The improved cattle have chiefly been obtained from Shropshire or Staffordshire, and have sometimes been crossed with the Galloway. Eastward of Merionethshire, and bordering on Cardigan, Radnor, and Shropshire, is

MONTGOMERYSHIRE.

Here, in the hill country, the cattle are diminutive, but no longer closely resembling the Anglesey. They are of a blood-red, with a dark smoky face, ill-made, although short legged; very hardy, good milkers, and with a tolerable disposition to fatten: but in the vales of the Severn and the Vyrnwy, the pasturage is excellent, and the breed of cattle much superior.

They are here of a light brown colour, with no white except a narrow band from the udder to the navel. The horns do not stand wide, or turn upwards, but are finely made, and of a true yellow colour. They bear considerable resemblance to the Devons; but in the grazing districts they are chiefly abandoned for the Herefords, which are found to be suitable to the soil and climate, and much better feeders. Considerable attention is here paid to the dairy, and particularly to the production of cheese, which is little inferior to the Cheshire.

The cows, in this division of the county, are not only fair milkers, but the cattle generally show great aptitude to fatten. The Rev. Mr. Davies, in his Survey of North Wales, quotes the opinion of 'a grazier of good judgment and great experience,' who prefers the breed of this district, because 'they collect bulk on the most valuable parts, and have less offal than those of Shropshire.' About nine months' feeding with grass, hay, and turnips, will add about threescore pounds' weight to each of their quarters.

The greater part of this county, and particularly the hills of Kerry and Hopetown are little more than waste land, and employed in the breeding and pasturing of sheep; on this account cattle are comparatively neglected; but a great many Radnorshire calving heifers used to be bought at the fairs on the borders and kept on straw and turnips until the spring, when the Cheshire drovers bought them for the dairies of the cheese-making districts.

Lying north of Merioneth and Montgomeryshire, is

DENBIGHSHIRE.

This is a great breeding county; but the cattle are generally, and in the hilly district particularly of an inferior kind, although resembling the Angleseys. The system of overstocking used to be carried to a ruinous extent here. In the vales, however, we begin to recognize a larger and more valuable breed—a cross between the Welsh and the long-horn—and prevailing more as we approach the borders of Flintshire. The dairy is considerably attended to in the lowlands, and some excellent cheese is produced there.

FLINTSHIRE.

This county is placed at the northern extremity of Wales; and is bounded on the north by the Irish Channel, and on the north-east by the estuary of the river Dee. The cattle here may almost be said to have lost their Welsh character. They most resemble their neighbours in Cheshire and in Shropshire, but with many variations. There cannot be said to be any distinct breed; for, from their near connexion with England, fresh supplies are continually brought in of almost every kind. A great many calves are also sent here, from Shropshire, to be suckled and grazed, and more particularly from Cheshire, according to the fancy of the breeders.

The Flintshire cattle appear to mingle the rare qualities of being excellent milkers and quick feeders. The Rev. Mr. Davies gives some illustrations of this. He says that 'a Flintshire cow, at Mertyn, of the true lean milking breed, gave, from May 1st to October 30th, 4026 quarts of milk, which produced 358 pounds avoirdupois of butter, being nearly equal to two pounds of butter and 22 quarts of milk per day, for 183 days successively.' On the other hand, he says, that a gentleman of Flintshire, after 'having worked his oxen until he had finished turnip-sowing in June, sold a pair of them to a neighbouring grazier for 25*l.*, being about the market-price. These, without the aid of any other luxury than rest from labour and plenty of grass, were so increased in bulk, by the December following, that they sold for more than double their prime cost.'

A considerable quantity of good butter is made in this district, but the attention of the dairyman is more devoted to the manufacture of cheese, which is little if at all, inferior to the genuine Cheshire. Each cow is supposed to produce nearly three hundred-weight of cheese every year.

SCOTLAND.

Scotland contains several distinct and valuable breeds of cattle evidently belonging to our present division, 'The Middle Horns.' The West Highlanders, whether we regard those that are found in the Hebrides, or the county of Argyle, seem to retain most of the aboriginal character. They have remained unchanged, or improved only by selection, for many generations, or indeed from the earliest accounts that we possess of Scottish cattle.

The North Highlanders are a smaller, coarser, and in every way inferior race, and owe the greater part of what is valuable about them to crosses from the Western breed.

The North-Eastern Cattle were derived from, and bear a strong resemblance to the West Highlander, but are of considerably larger size.

The Fife Breed are almost as valuable for the dairy, as for the grazier, and yield to few in activity and docility.

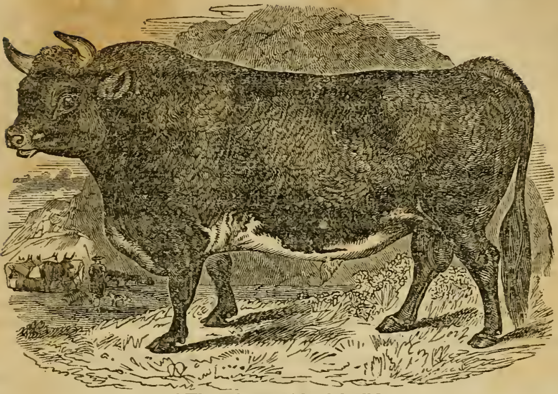
The Ayrshire Breed are second to none as milkers. Many of the varied mingling breeds of the *Lowlands* are valuable.

The Galloways, which scarcely a century ago were middle-horned, and with difficulty distinguished from the West Highlanders, are now a polled breed—increased in size with more striking resemblance to their kindred the Devons—with all their aptitude to fatten, and with a hardiness of constitution which the Devons never possessed. All these shall pass rapidly in review before us.

THE WEST HIGHLAND CATTLE.

We will first describe the cattle of the islands on the Western coast, to which the honour of being, or, at least of retaining the character of the primitive breed is now generally yielded, and whence are procured the purest and the best specimens selected to preserve or to improve the Highland cattle in other districts.

THE HEBRIDES OR WESTERN ISLANDS.



[*The West Highland Bull.*]

SKIRTING the coast, from the promontory of Cantire to the northern extremity of Scotland, is a range of islands appearing like so many fragments torn off from the main land—these are the Hebrides, or Hebudas; nearly two hundred in number, and about half of them inhabited by man. They may be conveniently divided into two groups, the inner and the outer; the inner consisting of the larger islands, and some of them separated from the main land by narrow channels only; and the outer Hebrides being thirty or forty miles farther from shore.

Little is known of the history of the Hebudans, except that they descended from the same stock with the Irish and the Highlanders; but were oftener exposed to the incursions of roving tribes from every quarter, and who successively mingled with, and were lost among, but never superseded the original inhabitants. If we are to credit the concurrent testimony of many old legends, and confirmed by the remains of ancient pillars, and castles, and fortifications, which some of the islands yet present, the Hebudans of early times were powerful and civilized. 'The kingdom of the Innsegallians was the pride of its allies and the terror of its foes.'*

Sir Walter Scott says, that 'in Malcolm's reign (Malcolm IV., 1153,) the Lords of the Hebridean islands, scarcely acknowledging even a nominal allegiance either to the crown of Scotland or that of Norway, though claimed by both countries, began to give much annoyance to the Western coasts of Scotland, to which their light-armed galleys or *birlins*, and their habits of piracy gave great facilities.'† 'Alexander II. died in the remote island of Kerrera in the Hebrides, while engaged in an expedition to compel the island chiefs to transfer to the Scottish king a homage which some of them had paid to Norway.'‡ In 1263, all the Western islands were annexed to the Scottish crown under Alexander III.§

The occupation and character of the Hebudans does not appear to have been ameliorated by this change; but the chiefs of the different islands, too far from the seat of government to be under much control, were continually at war with each other; and the arts of agriculture being neglected, they were compelled to resort to a predatory way of life in order to obtain the means of subsistence: and thus, for more than three centuries, the Hebrides were the resort of refugees, smugglers, and freebooters; and, at no very remote period, the inhabitants were singularly uncultivated, ignorant, idle, and miserable.

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* Macdonald's Scandena.

† History of Scotland, (Lardner's Cabinet Cyclopedia,) vol. i. p. 34.

‡ Ibid., p. 43.

§ Ibid., p. 47.

After, however, the union between the English and Scottish kingdoms, and when civilization had commenced on the mainland, the Hebrideans began to be reclaimed, and that was chiefly manifested in, and promoted by, a change of occupation. Although they did not abandon their seafaring life, they became honest, and were industrious fishermen, and they began to learn to be agriculturists. Their cattle, which had been totally neglected, and their value altogether unknown, retained their primitive character;* the Hebudans for the first time became aware of this, and they bred them in greater numbers, and a few of the most intelligent farmers endeavoured to improve them by selections from the best specimens of their native stock: the result has been, that the breeds of some of these islands now bear the highest price among the Highland cattle.

It may be supposed that in a group of islands extending nearly two hundred miles from north to south, there will be considerable difference in the character and value of the breed; but through the whole of them the striking peculiarities of the Highland cattle are sufficiently evident, except where they have been debased by the admixture of Irish blood. The principal difference is in the size, and there the cattle of the southernmost island, Islay, claim the superiority. This island is sheltered by its situation from the storms to which most of the others are exposed, and the pasturage is better; the cattle are therefore earlier ready for the market, and attain a greater weight. It is not, however, certain that this increase of size would be of advantage on the northern islands, or even on the mainland—the cattle, deprived of a portion of their hardihood, would not be proof against the inclemency of the weather, and would starve on such scanty forage as the Highlands in general can supply. Breeders are so much aware of this, that they endeavour to preserve the purity and value of their stock, by selecting, not from the districts where the size has increased, but, by almost general consent, from the Isle of Skye, where the cattle are small, *but are suited to the soil and to the climate; and can be most easily and securely raised at the least expense; and when removed to better provender, will thrive with a rapidity almost incredible.*

The origin of the term Kyloe is obscure. Some writers, and among whom is Sir John Sinclair, have curiously traced it to their crossing the many *Kyloes*, or ferries which abound in the West of Scotland; others, and with more propriety, and one of whom is Mr. Macdonald, the author of the Agriculture of the Highlands, tells us, that it is a corruption of the

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* That excellent agriculturist, Adam Ferguson, Esq., of Woodhill, expresses a similar opinion in his ingenious Essay on Crossing, contained in the First Number of the Quarterly Journal of Agriculture. 'I cannot but regard the West Highlanders, or, rather, *Islanders*, as more genuine than any other breed we possess in Scotland, excepting, it may be, the small remnant of aborigines in the park of his Grace the Duke of Hamilton. The moist climate, mild winter, and, consequently, grassy tendency of our Western Islands, point them out as having been, in all likelihood, early stocked with the Boves Tauri, of fine form and healthy constitution; and the little intercourse or commercial purposes with the mainland during many ages, gave a permanence to heir individuality not so easily secured elsewhere.

Gaelic word which signifies *highland*, and is commonly pronounced as if spelled Kaêl.

We have been favoured with the following excellent description of the true Kyloe, or West Highland bull, by Malcolm M'Neill Esq., of the Isle of Islay, the southernmost of the inner range of the Hebrides:—'The Highland bull should be black, the head not large, the ears thin, the muzzle fine, and rather turned up. He should be broad in the face, the eyes prominent, and the countenance calm and placid. The horns should taper finely to a point; and, neither drooping too much, nor rising too high, should be of a waxy colour, and widely set on at the root. The neck should be fine, particularly where it joins the head, and rising with a gentle curve from the shoulder. The breast wide, and projecting well before the legs. The shoulders broad at the top, and the chine so full as to leave but little hollow behind them. The girth behind the shoulder deep; the back straight, wide, and flat; the ribs broad, the space between them and the hips small; the belly not sinking low in the middle; yet, in the whole, not forming the round and barrell-like carcass which some have described. The thigh tapering to the hock-joint; the bones larger in proportion to the size than in the breeds of the southern districts, The tail set on a level with the back. The legs short and straight. The whole carcass covered with a thick long coat of hair, and plenty of hair also about the face and horns, and that hair not curly.

The value of the West Highland cattle consists in their being hardy, and easily fed; in that they will live, and sometimes thrive, on the coarsest pastures; that they will frequently gain from a fourth to a third of their original weight in six months' good feeding; that the proportion of offal is not greater than in the most improved larger breeds; that they will lay their flesh and fat equably on the best parts; and that, when fat, the beef is closed fine in the grain, highly flavoured and so well mixed or marbled, that it commands a superior price in every market.

The different islands of the Hebrides contain about one hundred and fifty thousand of these cattle, of which it is calculated that one-fifth are sent annually to the main land, principally through Jura, or across from the ferry of the Isle of Skye. If these average about 5*l.* per head, the amount will be 150,000*l.*, or more than the rental of the whole of the islands, which Mr. Macdonald calculated at 106,720*l.*, but which now produces a greater sum. Cattle, therefore, constitute the staple commodity of the Hebrides. Three thousand five hundred are annually exported from the island of Islay alone.

Mr. Moorhouse, from Craven, in Yorkshire, in 1763, was the first Englishman who came into the Hebrides to buy cattle. In the absence of her husband Mr. M'Donald, of Kingsburgh, he was kindly entertained by Flora M'Donald who made up for him the same bed that, seventeen years before, had received the unfortunate Prince Charles.

From Skye Mr. Moorhouse went to Raasay, whither in three days, Kingsburgh followed him; and, during a walk in the garden, on a fine harvest evening, they bargained for one thousand cattle, at two guineas a head, to be delivered free of expense at Falkirk. Two days before he had bought six hundred from Mr. M'Leod, of Waterside, at 2*l.* 5*s.* 6*d.*

Forty years ago the treatment of cattle was, with very few exceptions, absurd and ruinous, to a strange degree, through the whole of the Hebrides. With the exception of the milch cows, but not even of the calves, they were all wintered in the field: if they were scantily fed with hay, it was coarse, and withered, and half-rotten; or if they got a little straw, they were thought to be well taken care of. The majority got little more than sea-weed, heather, and rushes. One-fifth of the cattle, on an average, used to perish every winter from starvation. When the cold had been unusually severe, and the snow had lain long on the ground, one-half of the stock has been lost, and the remainder have afterwards been thinned by the diseases which poverty had engendered.

It proved the excellency of the breed, that in the course of two or three months so many of them got again into good store-condition, and might almost be said to be half-fat, and could scarcely be restrained by any fence: in fact, there are numerous instances of these cattle, which had been reduced to the most dreadful state of impoverishment, becoming fattened for the butcher in a few months, after being placed on some of the rich summer pastures of Islay, Lewis, or Skye.

The cows were housed during the winter; but among the small farmers this was conducted in a singular way—for one rude dwelling contained and sheltered both the family and the cattle. The family had their beds of straw or heath in the niches of the walls, while the litter was never removed from the cattle, but fresh layers of straw were occasionally laid down, and so the floor rose with the accumulation of dung and litter, until the season of spreading it upon the land, when it was at length taken away.*

The peculiarity of the climate and the want of inclosed lands, and the want, too, of forethought in the farmer, were the chief causes of this wretched system of winter starvation. The rapidity of vegetation in the latter part of the spring is astonishing in these islands. A good pasture can scarcely be left a fortnight without growing high and rank; and even the unenclosed and marshy and heathy grounds are comparatively luxuriant. In consequence of this the farmer fully stocked, or overstocked, even this pasture. He crowded his fields at the rate of six or eight beasts or more to an acre. From their natural aptitude to fatten they got into tolerable condition, but not such as they might have attained, whether destined for the salesman or the butcher. Winter, however, succeeded to summer: no provision had been made for it, except for the cows; and the beasts that were not properly fed even in the summer, languished and starved in the winter.†

The Hebrides, however, have partaken of that improvement in agriculture of which we shall have frequently to speak when describing the different districts of Scotland. In the island of Islay, the greater part of which is the property of Walter F. Campbell, Esq., and to whom we are indebted for much valuable information, the following is the general system of management among the better kind of farmers, and the account will apply to the Hebrides generally, and to Argyleshire.

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* Mr. Garnet in his 'Tour through the Highlands,' gives a sadder account of the frequent joint occupancy of the same hut, by the peasant and his cattle, in the Island of Mull. He had been speaking of the privations of the peasant, he adds—'Nor are his cattle in a better situation: in summer they pick up a scanty support among the morasses and heathy mountains, but in winter, when the ground is covered with snow, and when the naked wilds afford them neither shelter nor subsistence, the few cows, small, lean, and ready to drop for want of pasture, are brought into the hut where the family resides, and frequently share with them their little stock of meal which had been purchased or raised for the family only; while the cattle thus sustained, are bled occasionally to afford nourishment for the children after the mingled oatmeal and blood has been boiled or made into cakes.'

† Dr. Walker, in his Account of the Hebrides, gives a very curious statement of the disproportion between the stock and the rent of a farm; a disproportion which must be exceedingly great, however low the rental may be. 'A farm in Kintail was found to have on it 40 milch cows, which with their young stock, from a calf to a four-year old, made about 120 head of cattle; besides 80 ewes and 40 goats, which, with their young, were about 250; and 10 horses. Yet this farm, with arable land sufficient to supply all the family, was rented only at *twenty pounds* a-year.'

It is contrived, as much as possible, that the calves shall be dropped from the 1st of February to the middle of April. All the calves are reared; and for the first three or four months they are allowed to suck three times in the day, but they are not permitted to draw any great quantity at a time. In summer all the cattle are pastured; the calves are sent to their dams twice in the day, and the *strippings*, or last part of the milk, is taken away by the dairy-maid, for it is commonly supposed, that if the calf is allowed to draw all the milk he can, it will keep the dam in low condition, and prevent her being in calf in proper time. The calves are separated from their dams two or three weeks before the cast-cows are sent to the cattle-tryst at the end of October, for it is believed that if the cows had milk in their udders they might be injured in the long journeys they are then to take; the greater part of them being driven as far as the Lowland districts, whence they gradually find their way to the central and southern counties of England.

The calves are housed in the beginning of November, and are highly fed on hay and roots (for the raising of which the soil and climate are admirably adapted) until the month of May. When there is plenty of keep, the breeding cows are housed in November, but in general they are kept out until three or four weeks before calving. In May the whole cattle are turned out to pasture, and, if it is practicable, those of different ages are kept separate; while, by shifting the cattle, the pasture is kept as much as possible in eatable condition, that is, neither eaten too bare, nor allowed to get too rank, or to run into seed.

In the winter and the spring all the cattle except the breeding cows are fed in the fields, the grass of which is preserved from the 12th of August to the end of October. When these inclosures become bare, about the end of December, a little hay is taken into the field with turnips or potatoes, once or twice in the day, according to circumstances, until the middle or end of April. Few only of the farmers have these roots to give them, and the feeding of the out-lying cattle with straw is quite abolished. If any of them, however, are very materially out of condition, they are fed with oats in the sheaf. At two, or three, or four years old, all, except the heifers that are retained for breeding, are sent to market.

There is little or no variety of breeds of cattle in the Hebrides. They are pure West Highlanders. Indeed, it is the belief of the Hebridean farmer, that no other breed of cattle will thrive on these islands, and that the Kyloes could not possibly be improved by being crossed with any others. He appeals to his uniform experience, and most correctly so in the Hebrides, that attempts at crossing have only destroyed the symmetry of the Kyloes, and rendered them more delicate, and less suitable to the climate and the pasture.

By selection from the choicest of the stock, however, the West Highlander has been materially improved. The Islay, the Isle of Skye, and the Argyleshire beast, readily obtains a considerably higher price than any other cattle reared in the Highlands of Scotland. Mr. M'Neil has been eminently successful in his attempts to improve the native breed. He has often obtained 100*l*. for three and four-year-old bulls out of his stock; and for one bull he received 200*l*. He never breeds from bulls less than three years, or more than ten years old; and he disapproves, and rightly in such a climate, of the system of breeding in and in. He also adheres to that golden rule of breeding, the careful selection of the female; and, indeed, it is not a small sum that would induce the Hebridean farmer to part with any of his picked cows.

It is true that grazing has never been the principal object of the Hebridean farmer, or has scarcely been deemed worthy of his attention: there are very few cattle fattened upon any of the islands, or in the north or centre of Scotland; but *cast-cows* from some of the best stocks, when grass-fed in the Lowlands of Scotland, weigh more than forty Imperial stones. It may, however, be worth inquiry, whether the farmer has not forgotten his own interest in this exclusive pursuit of breeding. Mr. Macdonald, in his 'Survey of the Hebrides,' has placed this in an interesting point of view. He selects the islands of North Uist and Tiree for the purpose of illustration, because the improved system of husbandry is little adopted there, although the herbage is good. We will condense and a little alter his calculation, agreeably to the different prices and management of the present time:—

We will suppose that in October or November 900 head of neat cattle, well salted, and weighing 33 stones, Imperial, are sold at Greenock or Liverpool at 4*s*. 6*d*. per stone.* This would amount to .				£6687	0	0
We will also suppose that the same cattle, sold in April or May to the drovers, would have fetched 4*l*. 15*s*. per head; but as, in the course of six months, at least one in ten would have been lost by disease or accident, we will say that the farmer had then 1000 cattle at 4*l*. 15*s*. amounting to . .	£4,750	0	0			
The best grass is let at 12*s*. per head for these six months, making . .	600	0	0			
The expense of looking after, at 2*s*. per head	100	0	0			
Salt and casks, at 8*s*. each . .	360	0	0			
Sending to market, 5*s*. each . .	225	0	0			
Interest of 4,750*l*. for six months .	148	6	0			
Total expenses .				6,183	6	0
Balance in favour of fattening .				£503	14	0

Or more than 10 per cent; and this average is taken very low, for the cattle will usually weigh more than 20 stones per head.

It is fair, however, to suppose that the Hebridean farmer best knows his own interest—yet this may deserve consideration.

It will be concluded from what we have said of the milking properties of the Kyloe, that the dairy is considered as a matter of little consequence in the Hebrides; and the farmer rarely keeps more milch cows than will furnish his family with milk and butter and cheese. The Highland cow will not yield more than a third part of the milk that is obtained from the Ayrshire one at no great distance on the main land; but that milk is exceedingly rich, and the butter procured from it is excellent. In Arran and Bute, in the Firth of Clyde, the Ayrshire cow was partially introduced from the neighbouring coast, but in the other islands of the Hebrides, the Highland cow is obstinately retained. In North Uist and Tiree the dairy is more successfully followed than in the other islands, partly on account of the goodness of the herbage, but principally because the cows yield milk for a longer time after calving than in the neighbouring isles.

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* In some of the southern islands, and particularly in Collonsay and Islay, the pure native breed are frequently fattened to from 34 to 42 stones Imperial. Mr. Campbell, of Shawfield, had a heifer which, when slaughtered, weighed 63 stones; but among the lower class of farmers a bullock of fair size will weigh about 33 stones, and a heifer 25 stones. They are larger in the southern islands than they are in Skye, for the pasture is better, and they might be raised to a still greater size, were it not for the shameful system of overstocking, to which we shall have so often to allude.

The management of the dairy is exceedingly simple, and, from the very simplicity of it, other districts may learn a useful lesson. The cows are driven as slowly and quietly as possible to the fold; the wild character of the animals, as well as a regard to the quality of the milk, show the propriety of this. They are carefully drained to the last drop, not only on account of the superior richness of the latter portion of the milk, but because the retention of any part is apt to hasten, if it does not produce, that which is one of the principal objections to the Highland cows as milkers, the speedy drying up of their milk. The milk is carried to the house with as little disturbance as practicable, and put into vessels of not more than two or three inches in depth. The cream is supposed to rise more rapidly in these shallow vessels; and it is removed in the course of eighteen hours. A cow will not, on the average, yield more than 22 lbs. of butter (of 24 oz. each) in the summer season: she will yield about 90 lbs. of cheese, which is much liked by some on account of the aromatic flavour which is given to it by the mixture of rose-leaves, cinnamon, mace, cloves, and lemon with the rennet.*

Oxen are never used for the plough or on the road on any of the Hebrides.

We have stated that more than 20,000 of the Hebridean cattle are conveyed to the mainland, some of which find their way even to the southernmost counties of England; but like the other Highland cattle their journey is usually slow and interrupted. Their first resting-place is not a great way from the coast, for they are frequently wintered on the coarse pastures of Dumbartonshire; and in the next summer, after grazing awhile on the lower grounds, they are driven farther south, where they are fed during the second winter on turnips and hay. In April they are in good condition, and prepared for the early grass, on which they are finished.

Many of these small cattle are permanently arrested in their journey, and kept on low farms to consume the coarse grass, which other breeds refuse to eat; these are finished off on turnips, which are given them in the field about the end of Autumn, and they are sold about Christmas.

In the Outer Hebrides, principally separated from the inner range by the channel called the Minsh, and, from the apparent continuity in the range of the islands, and the hills all running in the same direction, called the Long Island, there is but little improvement in agriculture, although the pasturage is quite equal to the generality of that in the inner range, and the cattle are of somewhat more diminutive size. Mr. Macgillivray, in his 'Prize Essay on the present State of the Outer Hebrides,' says, 'The black cattle are small, but well proportioned; and on the tacksmen's farms (a tacksman is one who has a large tract of land, which he holds by

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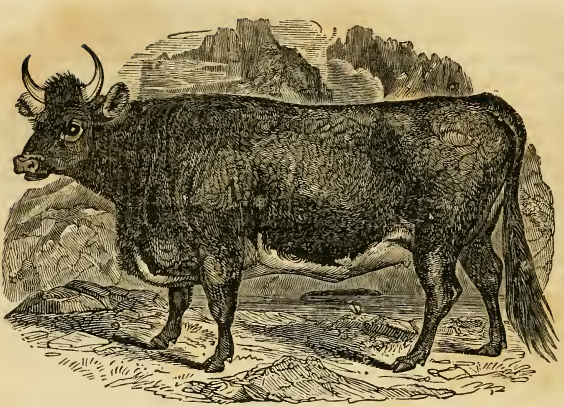
* Martin, in his account of the Western Isles of Scotland, sixty years ago, describes a superstition which then prevailed: 'It is a received opinion in these islands, that women, by a charm, or some other secret way, are able to convey the increase of their neighbours' cows' milk to their own use: and that the milk so charmed does not produce the ordinary quantity of butter, and the curds made of that milk are so tough that it cannot be made so firm as other cheese, and is also much lighter in weight. The butter so taken away and joined to the charmer's butter, is evidently discernible by a mark of separation, viz. the diversity of colours; that which is charmed being still paler than that part of the butter which hath not been charmed; and if butter having these marks be found with a suspected woman, she is directly said to be guilty. Their usual way of recovering their loss, is to take a little of the rennet from all the suspected persons, and put it in an egg-shell full of milk, and when that from the charmer is mingled with it, it curdles, and not before.'



[*The West Highland Cow.*]

lease) they are generally of good breed, and, although not heavy, very handsome. They are covered with a thick and long pile during winter and spring; and a good pile is considered one of the essential qualifications of a cow. The most common colours are black, red, brown, or *brandered*, (that is, a mixture of red and brown in stripes—*brindled.*) A whitish dun colour is also pretty frequently seen, not unlike that of the original wild cattle of Scotland, both the horned breed at Chillingham, and the polled one at Hamilton; and it is remarked, that in all their traditions or fables of what are called fairy-cattle, this is the colour ascribed to these animals. The breed of black cattle has been greatly improved of late years, by the importation of bulls and cows from various parts of the Highlands.'

On the tacksmen's farms the cattle are not housed in winter, excepting the calves; those belonging to the cottars generally are. In summer the cows and the milch-sheep are sent to the inland glens and moors, which are covered with hard grasses and rushes, because the portion that yields soft grass is not sufficient for their consumption during the whole year. They are attended by a woman from each family, who has a small hut or *shealing* for her habitation, and who makes the little butter and cheese which their scanty milk affords. The cows are thus kept in good pasture during the greater part of the summer and autumn, when the young beasts are sent to the moors. Towards the winter all the cattle are brought to the lower grounds, and the stirks are separated and housed at night. The latter are fed exclusively on hay and straw, portions of which are distributed to the other cattle during snow.

The cattle of the small tenants are all housed at night during the winter, and fed upon straw, hay, and the refuse of the family meals. The habitations of these people are usually divided into three apartments. The first, which occupies half the hut, is the general entrance, and contains the agricultural implements, poultry, and cattle. The second, comprising a fourth of the hut, is that in which the family reside; and the inner one, of the same size, is the sleeping room and granary. There are no chimneys; the smoke fills the whole hut, and escapes partly by a hole in the roof, partly by the door, and partly by orifices formed between the wall and the roof as substitutes for windows, and which, in stormy weather, are closed by a bundle of straw. The fire is placed in the middle of the floor. The soot accumulates on the roof, and, in rainy weather, is continually dropping, and for the purpose of obtaining it for manure, the hut is unroofed in the beginning of May. The dung of the cattle which had been accumulating during the winter and spring, and had been mixed with straw, ashes, and other matter, is at the same time removed from the outer apartment.

In the spring all the cattle are in poor condition, and those of the small tenants are in most wretched plight: sea-weed (chiefly Fucus canaliculatus,) boiled with husks of grain and a little meal or other substances are then employed to support them; and in many places the cattle during the winter and spring regularly betake themselves to the sea-shore at ebb-tide to feed upon the fuci.

The milk of the cows is said to be excellent, but on account of the filthy habits of too many of the cotters, the butter and cheese are eaten by few beside the natives.

Having described so much at length the cattle of the inner and outer Hebrides, we shall be able to pass with considerable rapidity over the other districts of the Highlands.

ARRAN AND BUTE.

These islands are separated from the other Hebrides by the promontory of Cantyre, and are situated in the Firth of Clyde, between Argyleshire and Ayrshire, and form a county under the name of Bute.

Almost the whole of Arran is the property of the Duke of Hamilton and Brandon, who kindly granted us every facility for becoming acquainted with the cattle of the island, and to whose very intelligent factor, Mr. Paterson, we are indebted for much valuable information.

Seventeen years ago Arran was overrun by cattle of almost every extraction and character. The West Highland was probably the native breed; but many had been imported from Ireland, as the situation of Arran would lead us to suspect; and more had been introduced from Galloway. The Earls of Carrick were formerly the proprietors of this district; and, at an early period, and even before the time of Robert I., they had probably introduced many cattle from their mainland estates into Arran, which was then little better than a mere hunting-ground. These breeds were intermingled in every possible way, but all of them were small, narrow across the loins, long legged and thin in the hams; their form was scraggy and angular, and the skin coarse, yet with little hair; they were black or brown but generally with white intermingled, frequently with white faces, and almost invariably with white about the belly.

They yielded very little milk, although that which they did give was good; and in the property of fattening, they were far inferior to those of the other islands which we have just described. In fact, the whole system of husbandry was wretched. Each farm was strangely let to various tenants who occupied in common or in *runridge; i. e.*, one of the tenants sowed one ridge, and a copartner the next, and so on; and the arable part of the farm was divided into numerous small lots, which were yearly apportioned, and almost yearly changed.* No improvement could be effected under such a system. The ridges were cropped with oats as long as it was supposed they would produce a little more than what was thrown upon them, and they were then abandoned until the weeds (no grass seeds were sown) covered them for some years, and they were thought to be able to bear two or three white crops again.

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* One of the oldest arrangements of the great proprietors of land was to collect their whole tenantry or vassalage as nearly as possible around their own mansion or castle. The neighbouring grounds were then divided into fields of various extent according to

The *croft* or *infield* land, that which was near the homesteads, although a little better treated, suffered too. It is true that it had all the manure of the farm, but it was cropped every year, and oats, and bear or bigg, and beans or potatoes (this last invaluable vegetable was just beginning to be known,) succeeded each other without pause; and the weeds were covered for a little while by the crop during summer, but never extirpated. Little fodder could be raised for cattle; and as there were no grass-seeds sown, there was no hay; and there was nothing to maintain the live-stock during winter but oat-straw.

Above what were called the *head-dykes*, *i. e.*, rude banks to separate the arable from the hill or pasture land, the cattle and sheep and horses ranged in common over the whole island; and the farmer, who, for generation after generation, had been taught to believe that his riches consisted in the number of his cattle instead of their individual worth, not only sent more cattle to the hills in summer than they could well maintain, but reserved far more than could possibly be kept in the winter. The number of cattle far exceeded that of the inhabitants: a great many of them were carried off by starvation and disease; and the remainder were found in the spring in a state of emaciation, provincially termed ‘ lifting;’ they were declining in size, and their good points were fast leaving them.

The Duke of Hamilton beheld this with much regret, and with a zeal for the improvement of the agriculture of the island, which reflects on him the highest credit, and which is the best direction that true patriotism can take, he set himself heartily to work, not only to ameliorate the breed of cattle, but to reform and change the general system of husbandry.

The leases of nearly the whole of the island terminated in 1814. The Duke directed that his fine property in Arran should be surveyed. He divided it into distinct and separate farms of different dimensions, from ten acres to suit the former tenants in common, to more than three or four hundred acres. He brought much of the waste land into cultivation by the spade; he excavated drains to the extent of 120 miles in length;

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the supposed nature of the soil; and again subdivided into parcels or ridges of equal size, corresponding with the number of the retainers: and one of the rigs or ridges was let or appropriated to each. It was thought that all would thus have an equal share of the good and the bad land, without partiality or preference, although each one's *possession* (the term still used) would probably be dispersed over a dozen places. This system of occupation was denominated *runrig* or *runridge*. Besides this general practice of having the land in *runrig*, it was customary in some places for the tenantry to exchange their respective ridges every year; so that, in a given course of years, each tenant would have rented and tilled the whole of the ridges. This was called *coup-rig*, or change-rig, A system more absurd or inconsistent with good cultivation can scarcely be imagined.

The division of arable lands into *infield* and *outfield*, was universal in Scotland, and is not yet obsolete. The *infield*, as stated in the text, got all the dung produced on the farm, and was kept under a constant rotation of crops. Lime and fallow and artificial grasses were unknown. The *outfield* bore three crops of oats, and, if it was more than usually good land, four crops, and then lay idle for five or six years. The consequence was, that, not more than forty years ago, the produce of every land was little in quantity and poor in quality: the horses were fed in summer almost entirely on thistles, which covered the *outfield* and grew too plentifully in the *infield*; and the owner of a little field which under improved cultivation, now produces ninety bushels of oats yearly, told the author, that although he sometimes had 1200 sheaves upon it, he would have given the whole of the grain for a single bushel of meal. He had straw for the winter feed of his cattle, but his family might starve.—See *Robertson's Rural Recollections*, p. 263.

he erected all necessary fences, and he built comfortable houses of various sizes. He then offered the farms at a moderate rent, but with these restrictions, that the land should be managed in a different and better manner, and that the number of cattle which were kept should not exceed a certain proportion to the size of the farm.

The old tenants were at first strangely averse to this new, and, as they thought, absurd and tyrannical system. Some of them quitted the island. The Duke then let some of his farms to enterprising tenants from better-cultivated districts; for he rightly judged that persons who had never seen land well managed, would much more readily adopt changes in the mode of husbandry if successfully made under their own observation, than if they were merely described to them, and in a manner forced upon them. The consequence has been, that the property of his Grace has more than doubled in value, and his tenantry are more prosperous and happy.

The Duke of Hamilton immediately introduced some choice and expensive bulls from the stock of the Duke of Argyle, in order to improve the wretched breed of cattle, but they were found at first to be too large for crossing the small cattle of Arran with perfect effect. Some bulls and queys of the dairy breed were brought from Ayrshire, but they did not well combine with the old stock of the island; their skins and hair were too thin for the bleak hills of Arran: and this cross was soon abandoned as a breeding stock. Some farmers, however, again had recourse to the Argyle bulls, for the breed had evidently improved, at least on some farms, and a spirit of emulation was beginning to be excited.

In consequence of this, several bulls of the Argyleshire sort were purchased by the duke in the summer of 1822, and placed in various parts of the country for the use of the tenants. The effect was now immediate, and palpable, and every year, and at very considerable expense, twenty or thirty fresh bulls were imported, and scattered in the most convenient places throughout the island; and, as far as influence and persuasion could go, the old breed was systematically discouraged.

The improvement was rapid and progressive. The Arran cattle are now black or brown, and horned, and in most parts of the island still retaining somewhat of the form of the original stock. This is most evident in the smallness of the limbs, the thinness of the neck, and the shortness of the hair. On the farms, however, of more careful breeders, the difference between the Arran and Argyleshire beasts can scarcely be observed, and that difference is yearly decreasing. The Arran improved black cattle are gentle-tempered, and kindly feeders; but better adapted for grazing than the dairy.

The Arran beasts used to be scarcely saleable; the southern drovers would not have them at any price: but in 1832 the stots of three years-off were sold in great numbers at ten pounds each after having been fed on grass alone, and queys at more than nine pounds. Cattle-husbandry has of late improved through the whole of Scotland; and in many of the districts the character of the breed is essentially changed, but no where has so much been done in a few years to ameliorate the stock, and better the condition of the tenantry. Twelve or fourteen years ago, the average weight of an aged Arran cow, when fed on grass, did not exceed eighteen or twenty stones: she would now be at least three or four stones heavier, and some of the oxen have reached forty-five or fifty stones.

The calves, which are generally dropped in spring, are not suffered to suck the dam, but are fed on milk for about six weeks. Two meals only are allowed them in the day, and two or three quarts of genuine milk are given at each meal. Some imagine that this quantity is not sufficient; and it is perhaps a general fault in the Isle of Arran that the calves get too little milk when they are young. A small portion of oatmeal is occasionally mixed with the milk, and particularly when the time for turning out approaches: some of the farmers, however, object to this, as frequently disordering the bowels, and producing griping, inflammation, and death.

The calves, when weaned, are turned on a reserved pasture on the low land. They are generally tethered until the crop is off the ground, and they go in and out with the cattle; but they are always housed at night, and none of them are sent to the hills during the first season. In winter a little boiled food is given to them, consisting of potatoes or greens, with chaff or straw, and chaff-fodder like the old cattle.

In summer the yearlings are sent to the hills, generally at no great distance from the dwelling; and, for the most part, they remain ont until the winter; then all the cattle, young and old, are housed during the night. While in the house they get straw-fodder, with sometimes a little hay; the older cattle are occasionally indulged with potatoes or a few turnips, and to this is added coarse, strong-growing, green kail, which is cultivated in every small farmer's garden for this purpose. This practice, if not peculiar to Arran, is practised there to a greater extent than in most other districts. The cattle calving in the winter, or early in the spring, are fed with kail, potatoes, and straw. Both the kail and potatoes are usually boiled, and sometimes the chaff, and the milch-cows almost always before calving, and sometimes for a little while afterwards, get some oats or meal boiled with their other provender. Notwithstanding the addition of the kail, the Arran cattle are not too well fed in the winter, and the growth of the young beasts is often materially stinted by a false economy. When the weather is not stormy, the cattle are driven out to pasture during the day—the young ones to the hills, and the older ones to the arable pastures and stubbles.

This system of housing at night is, in some instances, necessary on account of the exposed and shelterless situation of the farms; but, in other cases, it might, with advantage, be dispensed with, especially with regard to the young cattle; for it makes them tender, it prevents the growth of that covering of thick soft hair which nature provides as a protection against the searching blast, and it renders the beasts more liable to hoose and inflammation, when they must afterwards he exposed to no little cold while feeding on grass.

The majority of the cattle of Arran are sold in the autumn from two to three years old. They are transported to the mainland, and afterwards south, by the way of Dumfries, where they are fed on grass for another year, and thus generally well prepared for the butcher: a few stirks or yearlings are annually sold at the same time from farms on which too many have been reared. The greater part of Arran is a breeding and rearing district; but on a few farms the cattle are fattened on grass, and so successfully as to render it probable that the practice might be more generally pursued with considerable advantage. Some of the old cattle, when beginning to fail in milk, are fed off in the winter on turnips or potatoes, either for home consumption or to be sold to the drovers in the spring. About 800 head of cattle are yearly sent to the mainland from Arran.

The milch cows are housed at night even in the summer: they are brought home in the evening for milking, after which they get cut grass or clover during the night, and, having been milked again in the morning, are turned out for the day. The produce of milk has much increased with the improvement in general husbandry, and the consequent better keeping of the cows. Some of the black cattle will give from three to three and a half gallons of milk daily for four or five months after calving; the average quantity, however, will not much exceed two gallons; but the milk is excellent. There are some farms in which the Ayrshire cows are established, and these cattle give in Arran as much milk as in their native country. The small farmers consume the milk and butter and cheese which their cows produce; others sell a little butter; and the larger farmers manufacture a considerable quantity of cheese, which can scarcely be distinguished from the Ayrshire, and which is sent to the towns on the banks of the Clyde.

We have dwelt the longer on the cattle husbandry of this little island because it is a splendid example of what may be effected, in a very few years, by the exertions of one patriotic individual.

The circumstances which, until the last eighty years, caused the Scottish agriculturists to be so far behind their brethren in England, were the continuance of the feudal system, and consequent vassalage in the northern kingdom. Short leases alone were granted, frequently of not more than a twelvemonth; a great part of the rent was demanded in kind, and the tenant was harassed by the exaction of continual services in every oppressive form. But when services were abolished, and a fixed rent in money was established, and, by the length of the lease, security was given to the occupant that he should reap the fruits of his improvement, he began to set himself thoroughly to work. The rapidity of his improvement may be accounted for by circumstances which fall not to the lot of the southern agriculturists —tithes had been annihilated in Scotland, at least so far as the tenant was concerned, and the burden of supporting the poor was scarcely felt.

The Isle of Bute, in Gælic, signifying 'a bold furious head,' and so called from the rugged rocks on the southern extremity, while the island itself is comparatively flat, is higher up the Firth. It is about fifteen miles in length, and three in breadth, and contains 24,000 Scotch acres of ground. Rothsay gives the title of Duke to the heir-apparent of the British Crown; and was formerly the residence of some of the Scottish kings. The castle, a noble ruin, is still to be seen. Agriculture was even at a lower ebb in this island than in Arran, but it somewhat earlier began to emerge from its degraded state. The Marquis of Bute was induced, by the illness of his lady, to reside two years on the island. He had ocular demonstration of the lamentable condition of his estates, and of the county generally, and interest and patriotism induced him to endeavour to effect their improvement. He enclosed many of the farms. This was the first step, and without which every thing else would have been of no avail. He introduced the system of draining, fallowing, liming, &c., and much good was effected; but the attention of the Marquis being completely occupied at court; all was not accomplished that he wished; and the island, although improved, continues to rank low in the scale of agricultural merit. The cattle were small. The farms were overstocked with them. There was little sown grass, and no green food for winter; and until the pastures were better covered than formerly, all attempts materially to increase the value of the breed would necessarily fail. With the advancement of agriculture generally the cattle have increased in value, although they are still of a motley character; and they are beginning to have considerably more of the Ayrshire breed in them than is to be found in Arran.

ARGYLESHIRE.

The county of Argyle stretches along the western coast of Scotland for 115 miles, but its average breadth is little more than 30 miles. The southern part is low, and comparatively level, and the temperature is mild. The northern part is rugged and mountainous, and the climate cold and ungenial. In the northern part there is much barren land, and little good pasture; but in Cantire, at the south, there is plenty of excellent feed for cattle; therefore the cattle differ materially in the northern and southern parts of the country. Among the mountains, the Highland breed is found almost unmixed; in the level country, there is the same variety and mixture of breed which is observed in other dairy districts.

Although the system of sheep-husbandry has been introduced into Argyle, and is increasing there, yet, including every kind, there are supposed to be nearly 65,000 black cattle in the county. John Campbell, from Logwine, in Ayrshire, was the first who stocked a farm with sheep in Argyleshire, in the year 1760, in the united parishes of Lochgoil Head and Kilmorick. The country-people regarded him at first with an evil eye, but the superiority of sheep-husbandry is now acknowledged in all the mountainous districts of Scotland.

The North Argyle cattle are larger than the Hebrideans, and are now bred to the full size which the soil, or the best qualities of the animal will bear. That fundamental principle of breeding is generally adopted here, that the size must be determined by the soil and the food; and that it is far more profitable to the farmer to have the size of his breed under, rather than over, the produce of his land. Both will gradually adapt themselves to the soil; but the small beast will become more bulky, and improve in all his points—the large one will degenerate in form and in every good quality. Therefore, the soil and management of Argyle being, generally speaking, better than that of the Hebrides, it was found that a somewhat larger animal might be admitted; he was, however, procured, not by crossing with a breed of superior size, but by careful selection from the best of the pure breed. Experience and judgment soon discovered when the proper point—the profitable weight—was gained; and then the farmer went back to the equally pure, but smaller breed of Skye, lest the form should be deteriorated, and the fattening should not be so equable and true, and the meat should lose some of its beautiful character and flavour.

There is no part of the Highlands where the soil and the climate are better adapted to the perfection of the breed than in Argyle, or where we oftener see the true characteristics of the best Highland cattle—short, and somewhat strong in the shank, round in the body, straight in the back, well-haired, long in the muzzle, and with a well-turned and rather small horn. There is no district in which the farmer so superstitiously, and yet we will say properly, refrains from foreign admixture. Could the two great errors of the Highland farmer be remedied, but which are found even here—namely, overstocking in the summer and starving in the winter—there would be nothing more to desire, so far as the grazier is concerned, except, perhaps docility of temper; and that will be gradually acquired when further improvements in agriculture have rendered it unnecessary for the beast to wander so far, and over so wild a country, in search of food, and when he will be earlier and more perfectly domesticated. The Highlander, however, must be reared for the grazier alone. Every attention to increase his weight, in order to make him capable of agricultural labour—every effort to qualify him for the dairy, will not only lessen his hardiness of constitution and propensity to fatten, but will fail in rendering him valuable for the purpose at which the farmer foolishly aims. The character of the Highlander must still be, that he will pay better for his quantity of food than any other breed, and will fatten where any other breed would scarcely live. This is the grand secret of profitably breeding or grazing the Highland cattle.

The management both of the cow and her calf depend much on the object which the breeder principally pursues. If he studies the character of his stock, he makes little butter and cheese, generally rears a calf for every cow, giving it the greater part of her milk. A likely bull-calf is sometimes allowed the milk of two cows for a considerable time, and often for six months. When the calves are weaned, they are fed on the hills during the summer, and brought on the lower grounds in winter; and if the pasture is not good, they are occasionally fed with straw and hay. It is after the first winter that the absurd and cruel system of overstocking and starving commences. From the superiority of the soil, however, this is not carried to the ruinous extent that it is in the Hebrides. In favourable situations, some farmers winter their calves in open sheds, where they are fed with hay in the racks. This makes them hardier, and does not cripple their growth.

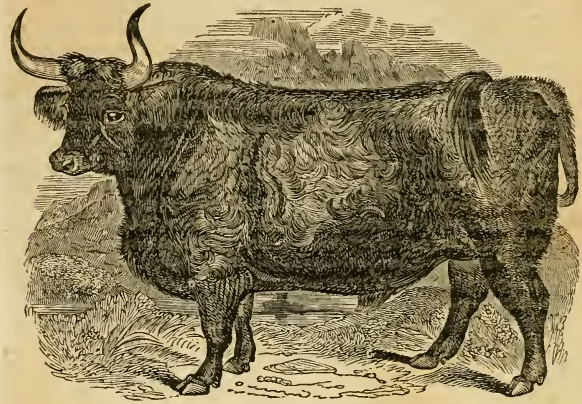
The following has been given as the expense of rearing a Highland stot in Argyleshire:

To milk to the calf while sucking, 1½ Scotch pints per day, at 2*d*. per pint - - - -	£2	5	6
To expense of keeping the calf housed and fed on straw and hay during the first winter, 12*s*.—but deducting 3*s*. for manure, there remains - -	0	9	0
To pasture next summer on hill grass - -	0	7	6
To keeping next winter on low grounds, and feeding in the fields with hay when necessary - -	0	10	0
To pasture on hilly ground next summer, being then 2½ years old - - - - -	0	7	6
Deduct for risk of deaths - - -	0	15	0
Interest of money - - - -	0	5	0
	£4	19	6

Supposing that they then sell for five guineas at first hand—and the average price will not much exceed this—the profit will be but 5*s*. 6*d*. This and the increased price of corn will sufficiently account for the gradual substitution of sheep for cattle on the greater part of the breeding country of Scotland.

The Argyleshire farmer is sometimes wrong in breeding from a favourite cow too long. Although the Highlanders fatten rapidly for a certain time, and begin early to fatten where the pasturage will give them opportunity to show it, they do not thrive so well when old. A cow ultimately destined for the drover should not be permitted to breed after six years-old. She may make fair meat for home consumption, but she will not fatten so quickly, or so truly, and on all her points; and, in fact, the drover will seldom purchase her except at a very inferior price.

It is now also established as a principle among them, that the same bull should not be used too long. The hardiness of some of the cattle has been thought to be materially affected by it. The bulls are generally disposed of at six years-old, when they are in full vigour, and valuable for some distant herd.



[*The Argyle Ox.*]

The native cattle in Cantire, or the south of Argyle, are of a thinner, lighter make, and not well haired; they are evidently of Highland extraction, but they show much crossing with Irish blood. They are better adapted for the pasturage which they find, and are fair milkers; therefore the dairy was always more attended to than rearing in the district of Cantire. The Ayrshire cow has, however, nearly superseded the native breed, not only in Cantire, but through the whole of Argyleshire, for the purposes of the dairy. She is promising to spread as rapidly and as widely through the middle and northern parts of Scotland as the shorthorn has done along the whole of the eastern part of England. A few Holderness cows were tried, but with doubtful success. The West Highland cattle are universally adopted for grazing farms, and the Ayrshire nearly as generally for the dairy. The butter is good, except that it is often too salt; little, however, can be said in favour of the cheese. The manufacturer of the cheese is often more in fault than the milk or the pasture; for in Cantire he usually keeps his milk forty-eight hours, in order to separate all the cream, and before the expiration of that time it is quite impoverished and becoming sour; curds of different ages are also mixed together, and which will not amalgamate and form one uniform mass.

Some Galloways are found in Argyle, and particularly in the southern part of the county; but they are not equal to the native Highlanders. The latter have sometimes been crossed with the Galloways, to give increase of weight; but the experiment has not succeeded: they have neither fattened so quickly, nor so equably.

INVERNESS.

This county will complete the Western Highlands, properly so called. Inverness stretches across the mainland from the little channel that divides it from Skye to the Murray Firth. The ferry of Kyle Rhea, on the north-western point of it, connects together the different districts inhabited by the Highland cattle; for all the cattle from Skye and the outer Hebrides cross that ferry, not only in their way to Inverness and Argyle, but to all the southern markets. Six or seven thousand annually pass this little strait. They are not ferried in boats, as from the Long Island to Skye, but by means of ropes, about a yard in length, with a noose at each end, one of which is tied to the tail of the cow that is to swim before, and the other round the jaw and under the tongue of the next; and the beasts are thus connected together until there is a string of six or eight. The time of high water is chosen, when, although the passage is wider, there is less current. The beasts are led into the water as quietly as possible until they are afloat, when they immediately cease to resist, then the man at the stern of the ferry-boat taking hold of the rope that holds the foremost beasts, the vessel is rowed steadily across, and the cattle follow without a struggle. It is very rarely that one of them is lost.

The cattle, at least in Lochaber, and along the western coast of Inverness, and on the borders of Ross, are essentially the same as those in the north of Argyle, and their treatment, with all its faults, the same. In the central parts of the county, however, the breed is mixed, and principally with the Galloway, or Fife, or Irish. On the borders of Murray there is still a different breed, the origin of which it is difficult to trace; heavier than the Highlanders; better milkers; but not so profitable for the grazier. It is said that they were first bred of this superior size to make them heavy enough for the yoke, but at present the ox is never used either for the plough or on the road. So late, however, as the year 1791, the Rev. Mr. Smith, in his statistical account of the parish of Petty on the Moray Firth, says, that '1400 oxen were employed in that neighbourhood on husbandry work.' He adds, that 'they were of the light nimble Highland breed; and, when unfit for work, disposed of to the dealers in cattle for the English markets.' Few of them, however, were reared in Inverness, but were brought from the Highlands when young.

The system of summer feeding, or '*going to shealings*,' which we have described as occasionally followed in the Hebrides, used to prevail in Inverness; but, as agriculture has improved, and sheep-feeding was introduced, these rights of pasturing on the distant wastes were let to shepherds, who live on them all the year.*

Dr. Robertson, in his 'Survey of Inverness,' gives the following description of 'the shealings:'—'After the crops had been sown, and the peats cut, the inhabitants removed annually, in the month of June, to their distant pastures, with all their cattle and families; and there, in some snug spot, the best sheltered in all the range allotted to the cattle, they resided for a certain number of weeks, until the pasture became scarce. A trusty person was sent before them to drive away any wandering cattle that might have trespassed within the bounds that were to be preserved. The men returned occasionally to the farm or homestead, to collect the fuel, or hoe the potatoes, or weed the crop; and, when the season for weeding the flax arrived the women went home for that purpose. When the bounds are extensive they have frequently more than one of these stations, which are called *ree* or *aree*,* in the language of the country, and *shealings* in English. In such cases the guardian of the grass was sent forward to another shealing whenever the family arrived at that destined for their temporary residence. He was called the *poindler*, probably because he had public authority to poind (whence, pound,) and confine the stray cattle, and to demand the fine established by law for the trespass. When these pastures were unusually rich, as at the head of a lake or by the sides of brooks in the valleys, the inhabitants of two or more farms associated together, and ate the grass of their *shealings* in common. This was the season of contentment and often of festivity. The women employed themselves in spinning wool to clothe their families, and in making butter and cheese for part of their winter provisions;† and the youths occupied themselves in fishing or athletic exercises; and at evening the primitive custom of dancing on the green and singing Gaelic songs was not forgotten. The shealings lasted from one to two months or more, and when the pasture was all consumed they returned to their homesteads.'‡

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* It is mentioned in Sir John Sinclair's 'Statistical Account of Scotland,' where the parish of Laagan, in the mountainous country to the south-west of Inverness, is described, that the number of cattle had considerably decreased in that district; 'people deeming it more profitable to reduce their stock of black cattle, and increase their stock of sheep. But the cattle that remain are very much improved. Twenty years ago (1770) a Highland stot was not worth more than 20*l.* Scots, whereas it will now sell for 3*l.* or 4*l*, sterling; and milch cows have risen in value from 3*l.* 10*s.* to 5*l.* or 6*l.*' Black cattle, however, may still be considered as the staple riches of Inverness, and on which principally the farmers depend to enable them to pay their rents.

The Rev. Mr. M'Lean, in an Appendix to this Survey, has some remarks on these shealings, the importance of which has been acknowledged by the Inverness farmers, and the most valuable part of what he recommended has been adopted. He is speaking of the system of overstocking generally, and even on these shealings. He says that, 'on every farm, an overstock is kept. If the cattle are brought through the winter, that is considered sufficient; and after a severe winter they appear in a most miserable plight, and those of them intended for sale are seldom fit for the market before the end of the summer;' and, he asks, 'is there not an evident loss here?—is there not more profit from one beast well, than from two poorly or indifferently kept?' He, therefore, submitted to the Society of Agriculture 'to give premiums to those who shall have their *whole* stock of black cattle in the best order in the month of May, or who, in that month, shall have the beasts intended for sale in the best marketable condition. An emulation of this kind would prove an incitement to *the cultivation of turnips and sown grass*, as without these, it is not easy to keep cattle in good order through the winter.' He also asks 'whether it would not be for the interest of the tenants not to keep a larger stock of black cattle than they could maintain without sending any part of it to the hill at any season of the year, and *that the hill-grass should be applied exclusively to the maintenance of sheep?* Mr. M'Lean little thought how soon the sheep would be thus introduced, and how many 'flocks' would be fed 'on the Grampian hills,' to the improvement, and not the diminution and deterioration of the breed of cattle.

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* *Ree* is a Gaelic word, which signifies a *deer-forest:* these shealings, therefore, were the first encroachments made by the inhabitants and their cattle on the territories of the deer, after they had got full possession of the *straths*, or lower valleys.

† Mr. Stewart, in his 'Highland Superstitions,' tells us that great virtue was once supposed to belong to some of this cheese, but the difficulty which attended the manufacture of it corresponded with its value. He says, 'you must go to the summit of some steep cliff or mountain, *where the feet of quadrupeds never trod*, and gather that herb in the Gaelic language called 'mohan,' which can be pointed out by any 'wise person.' This herb you must give to the cow; and of the milk of the cow you are to make a cheese, and whoever eats of that cheese is for ever after perfectly secure from every species of fairy agency.'

‡ The Rev. Mr. Bremmer, in his Statistical Account of Walls in the Orkneys, says of these shealings,—'Their household furniture must be described negatively. No bed, no table, no chair. These the Highlander does not reckon among the necessaries of life, as he can make the earth serve him for all the three. In his shealing, composed of earth and a few sticks, you find no other furniture than a few dishes for his milk, and a bowl for his meal: so true in fact, as well as in philosophy, is the maxim, "nature is content with a little."'

If Inverness were no otherwise interesting to the agriculturist, it would have some importance in his estimation as the grand mart of the West Highland cattle. Not only all those from Skye and the outer Hebrides are sent there for sale, and many come from Argyle to the *trysts* of Inverness, whence they travel south again, but it contains within itself more than 42000 head of cattle. These *trysts* are not fairs or markets appointed by public authority, but by concert among the dealers. The manner of conducting them is very curious. When the drovers from the south, or from the interior of Scotland, make their appearance in the Highlands, about the latter end of April or the beginning of May, they give notice at the churches that, on a particular day, and at some central place in the district, they will be ready to purchase.

The price is, like that of every thing else, regulated by the demand, and of this the farmers can only judge by the number of the drovers or the intelligence which they have received from their correspondents in the south. Much address is used on both sides to feel the pulse of the market at these meetings, and perhaps many trysts are held before the price is finally determined. Some appear to be resolved to guard themselves from imposition, for they sell their cattle conditionally, bargaining that if the prices rise within a limited time they shall receive so much more, and that if they fall the drover shall obtain a deduction.

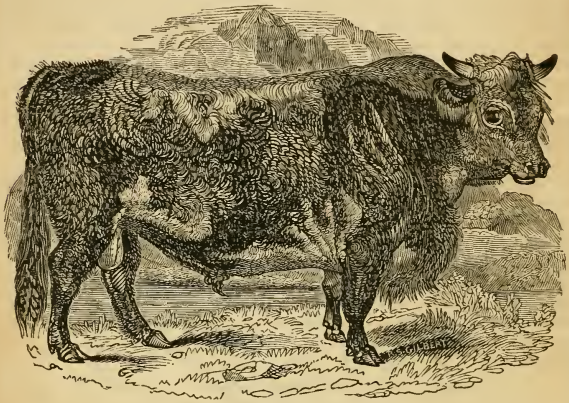
This traffic is carried on, with little intermission; from May to October; for from the system of winter starvation, too much pursued, comparatively few may be able to travel at first, or for a considerable time afterwards; although the cattle that are ready fetch the best price, because they can be immediately put on the southern pastures.

The practice of letting cattle for hire is not unfrequent in Inverness. The hirer is usually bound to furnish the owner with one calf, one stone (of twenty-two pounds) of butter, and two stones of cheese annually, or one calf and a variable sum of money according to the quality of the cattle, all expenses of keep being defrayed by the owner. This is a very unsatisfactory mode of conducting a farm; and when the interests of the two parties are continually clashing, as they must with such an arrangement, there can be little cordiality on either side, and there will often be great injustice on both.

THE NORTH HIGHLAND CATTLE.

These occupy the whole of Scotland north of Inverness, including the counties of Ross, Sutherland and Caithness, and the Orkney and Shetland islands. The cattle were exceedingly different from those which we have described, more diminutive in size, and fifty years ago were deficient in many valuable points. The heads of the native breed were large and coarse, the backs high and narrow, the ribs flat, the chest small, the bones large, the legs long; and, as a necessary consequence of all this, there was great difficulty in getting them fat at all, and they never fattened equably. This is easily explained by the consideration that the climate is cold, the country is an arable one, the distance from the market is great, and, therefore, the breeding of cattle had not always been a consideration of much importance to the farmer. This defect and disgrace of the northern district was at length forced on the attention of the agriculturist, and, by crosses from various breeds, he has endeavoured to improve his stock both for the dairy, the grazier. and the plough: with what success he has laboured, a rapid survey of the northern counties will show.

THE SHETLAND ISLANDS.



[*The Shetland Bull.*]

We commence with the northernmost group of islands, situated nearly half-way between the coasts of Scotland and Norway. They consist of one chief island, nearly sixty miles in length, and ten or twelve in breadth, and a numerous group of diminutive ones scattered around, and particularly on the north. Jaimeson, in his 'Mineralogy,' page 2, says that, 'on viewing these islands, a wonderful scene of rugged, black, and barren rocks presents itself to our view. No tree or shrub appears to relieve the eye in wandering over these dreary scenes, and only gray rocks appear rising from the midst of marshes, and pools, and shores, bounded by the wildest precipices.' There are, in fact, few or no artificial grasses or green crops, or enclosures capable of protecting these crops, and grasses could not be brought to perfection in the open fields of these islands: there is nothing but moss, and heath and sea-weed, yet there is a breed of horses, diminutive, indeed, but beautiful, and hardy, and strong; and the cattle exhibit evident traces of the same origin with the West Highlanders. They have been diminished in size by the coldness of the climate and the scarcity of food; but they have not been so seriously injured by the folly of men—they have not been domesticated to be starved outright. They are small, gaunt, ill shaped, so far, indeed, as their shape can be ascertained through the long thick hair with which they are covered, and which forms an impenetrable defence against the snow and the sleet. They are rarely more than four feet high at the withers, and sometimes scarcely more than thirty-five or forty pounds a quarter.

The Shetland cattle contrive to live on their native moors and wastes, and some of them fatten there; for a considerable and increasing quantity of beef is salted in Shetland and sent to the mainland, the quality of which is exceedingly good. When, however, the Shetlanders are transported to the comparatively richer pastures of the north of Scotland, they thrive with almost incredible rapidity, and their flesh and fat, being so newly and quickly laid on, is said to be peculiarly delicious and tender. They run to fifteen or sixteen, or even twenty stones in weight. If they are carried still farther south they rarely thrive; they become sickly, and even poor, in the midst of abundance: the change is too great, and the constitution cannot become habituated to it. The Duke of Bedford and Mr. Wilmot Horton have given a fair trial to these Lilliputian cattle, and the result has not been satisfactory.

The Shetland cows are housed every night, whether in winter or summer; and not having straw for litter, the defect is supplied by heath and peat-dust. The dung used to be suffered to accumulate in a strange manner. Instead of being daily carried out, it was spread over the byre, until the cattle could no longer find entrance between the floor and the roof. Then only it was of necessity removed. They yield a very small portion of milk, whether in their native country or elsewhere, but that which they do give is exceedingly rich.

The Shetlanders have a curious way of extracting the butter from it. The milk is put into the churn as soon as procured, and in small farms two or three days elapse before the vessel is full. The process of churning then commences; and when the butter is about to separate from the whey some red-hot stones are thrown in, and the churning continued until the separation is complete, and the butter floats on the top. This is sometimes very carefully washed for home-consumption or for the market; but when it is destined to constitute part of the rent (for a portion of that was, not many years ago, demanded in kind) it was sadly dirty and badly tasted. The butter-milk is then boiled, and another portion of butter is separated, which is not so rich: this is chiefly reserved for home use. The remaining fluid, called *bland*, used to be, but is not so much now, the ordinary drink of the poorer Shetlanders. It is sometimes preserved until the winter, and is supposed to be very wholesome.

A country so barren may be easily overstocked, and it is so to a certain degree, particularly since the introduction of sheep husbandry. A great many of the calves are therefore killed very early, and some even on the day that they are dropped. The calves that are reared are never allowed to suck their mothers, but are fed, at first, with milk, and afterwards with bland. This is poor food, but they are by this means early prepared for the privations to which they are afterwards exposed.

The little Shetland oxen are still occasionally worked in the plough. Horses and oxen were formerly yoked abreast to the same plough; but the oxen are gradually getting into disuse: indeed a great part of the island is too rocky for the plough, and is dug with the spade; and, sometimes, even at the present day, the spade husbandry is used where the plough might be profitably introduced.

Some of the smaller islands called '*The Holmes*,' and which are nearly or quite uninhabited, yield more succulent pasture; and the cattle are occasionally sent there to prepare them for their migration to the south. They thrive rapidly on these little solitudes. When a statistical account of these islands was taken forty years ago, they contained 3000 cows, 1000 oxen, and 10,000 young cattle. They have, however rapidly increased, for more than 44,000 now inhabit the Shetland and Orkney Islands. It is much to be regretted that so numerous and valuable a breed should be so much neglected: but the fact is, that the Shetland isles are principally a fishing station. Their very appearance caused them to be selected for this purpose, and the profits occasionally resulting from the fisheries—to the heritors or proprietors, at least—have made them, and the inhabitants of the Orkneys, comparatively careless as to the productions of the soil.

THE ORKNEY ISLANDS.

The Orkney Islands, or ancient Orcades, lie much nearer the mainland, and are not so considerable as the Shetland Islands. The number of inhabited islands is twenty-nine, and there are thirty-nine smaller ones, called *holmes*, covered with constant herbage, and on which cattle and sheep are sometimes grazed. The climate is moist and variable, the summer short, and rarely hot, the winters long, but not cold, the spring late, and the ungenial weather often continuing until June.

The cattle, which were formerly even smaller and more ill-shaped than the Shetlanders, have been considerably improved, for there is much good pasture in the Orkneys; but there is necessity for greater improvement in the management of them ere they can become a very profitable stock. So late as 1795 'all the cattle, except the milch-cows, were turned out to the hills and moors, where they made a shift to preserve life, but were stinted in their growth, and the queys were often five and six years old before they had a calf. When the cattle are thus turned out to their liberty,' the reporter says, 'he whose corn is unripe must cut it down, or expect to have it destroyed; and when hunger and cold force home the half-starved cattle from the hill, the hill dykes are too weak to keep them out; it is impossible either to poind these animals, or to prevent their incursions; and they must be hunted with dogs to the mountains, perhaps after dozens of them have run through fields of standing corn.'—*Rev. J. Malcom's Statistical Account of Stenness.*

The cattle are better milkers than the Shetlanders, and quite as good feeders. More oxen are used fot agricultural labour, and they are decidedly better for this purpose than the Shetlanders; yet, compared with the Western Highlanders; they are an inferior race. Their heads are low, their backs high, their buttocks thin, their bones prominent, their horns short, and bending towards the forehead.*

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* Mr. Morison, in his 'Statistical Account of the Parish of Dalting,' after saying that a small part of it only is under cultivation, gives a very curious account of the manner of ploughing. He says, that 'there are not more than six ploughs in the parish. The plough is made of a small crooked piece of wood, at the end of which is fixed a slender pliable piece of oak, that is fastened to the yoke laid across the necks of the oxen. The man who holds the plough walks by its side, and directs it with a stilt or handle fixed to the top of it. The driver, if so he can be called, goes before the oxen, and pulls them on by a rope tied round their horns, and some people with spades follow the plough, to level the furrow and break the clods.

'A considerable number of cattle and sheep are sold to the Lerwick merchants, who kill them, and send them packed to Leith market: 700 milch cows are kept in the parish, besides oxen and young cattle. A great part of the land is let on *butter-rent.* Good 12*d.* land will let at sixteen merks of butter (about 20 lbs.), and 24*s.* Scots (2*s.* English) per merk, equivalent to about three-fourths of an acre. The butter is generally compounded for at the average price. Beside this, 40*d.* is required from each family for services, (assisting in the reaping, hay-making, and various agricultural labours,) if they are not paid in kind; and also a cock and a hen is demanded for every two merks of land.' These relics, however, of feudal tenure are now growing into disuse. At that time a good ox was worth 36*l.* (3*l.* sterling) Scots; and a fat cow sold for 24*l.* (2*l.* sterling). The ox would weigh from 300 to 400 cwt., and the cow from 170 to 250 lbs.

Mr. Morison says, that 'the situation of that parish, and of the Highlands generally,

CAITHNESS.

This is the northernmost county of Scotland, and the climate is cold and ungenial; there is no highland on the north coast to break the force of the wind, which sets in during the greater part of the year from the north-west or the west. In that season of the year when vegetation is most rapid in other countries, namely, from the beginning of May to the middle of June, the north-west wind blows incessantly, and the growth of everything is completely checked. Three-fourths of the whole surface of the county is either a deep peat-moss, or lofty barren mountain covered only with peat-earth and heather. It will not then be wondered at that, not fifty years ago, the Caithness breed of cattle, although hardy, was the worst in all Scotland. The distance of this county from all the markets for cattle, discouraged any attempt at improving the breed, and the same improvident system of overstocking which we have reprobated in the Highlands completed the evil*. Captain Henderson, the scientific as well as instructive author of the ‘Agricultural Survey of Caithness,’ very expressively says that ‘these animals were not fed, but merely kept alive by a little straw given them twice a day from the end of December until the hill-pasture would recover them in May and June; and that being thus starved one-half of the year, they assumed a thin, lank shape.†’

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was most deplorable in the winter of 1784. The crop of oats failed in 1782. It was worse in 1783; and the winter of 1784 was a long and severe one. Many cattle died of absolute starvation. A mortality broke out, and destroyed many more; 427 were lost in that parish. Oats rose to 45*s.* per boll. The most substantial farmers fared badly; the poorer ones lived on welks, and limpets, and such other fish as the sea shore afforded.'—*Sir John Sinclair's Statistical Account of Scotland.*

* The Rev. Mr. Cameron, in his Statistical Account of Halkirk, in this county, has some appropriate remarks on this point:—‘I am persuaded that the number (of black cattle) reared is near one-third more than it ought to have been, or the parish can well maintain. This is the cause why our cows do not usually yield so much milk as might be expected—why the cattle are in general poorer, and of less size than they might have been, and consequently fetch such low prices in the market. What is their motive for this unfrugal and mistaken plan? Because the commerce in that cattle is their principal dependence; and they calculate their stock according to their number, and not according to their quality. Besides, having no other way to answer Martinmas demands, they pinch their families in the necessary food arising from these animals, from an overweaning expectation, and the mistaken idea, that if they have plenty of calves they will be able to answer these demands, which hang a mighty terror over their heads every year. Thus it happens that they themselves and their cattle are half-starved, and their ill-founded expectations often frustrated. Whereas, had they adopted another plan, and kept an adequate number of cattle only, their families would be better supported, their cattle better in quality and value, and the demands of the landlord more readily answered.’

† The Rev. Mr. Taylor, in his Statistical Account of Watlin, in this county, in 1794, very strongly and properly reprobates the system of cattle-management in Caithness. He says—‘From our remote situation and little intercourse with other countries, we have hitherto been neglected, if not despised. Of late, strangers have begun to creep in among us, but there are local practices and local prejudices among us which require to be laid aside before great improvement can take place, or strangers reside with real comfort to themselves. From time immemorial it had been the practice here, for cattle of all kinds to travel and feed promiscuously, without distinction of property, from the day the last sheaf was put into the farm-yard till the conclusion of the bean seed, in the end of May, or the beginning of June. The prejudice of this practice to land in general, and to arable land in particular, is sufficiently evident. The active, enterprising farmer can never avail himself of all the advantages to be derived from his possession, unless he is at liberty to use and lay it out as he pleases. He can never benefit himself either by fallow or green crops, so long as cattle of every kind—his neighbors, as well as his own—are at freedom, for eight months nearly out of twelve, to traverse his fields, day and night, wet and dry. Such a custom may, and no doubt does profit the sluggard. His cattle are half maintained at the expense of his neighbour; but men of this description ought not to be supported at the expense of the willing, industrious farmers. His

Caithness affords a splendid example of what one scientific and zealous man is capable of effecting. Sir John Sinclair had large property in Caithness: he observed and lamented, and materially suffered by this wretched state of the cattle, and thought of many plans for their improvement. He first tried what he could do by crossing the native breed. The chest was small, and the ribs flat, and the back thin; there was not room for the heart to beat nor the lungs to play. He first thought of the deep chest, and broad loins, and barrelled carcase of the Galloway. Here seemed to be the very points in which the Caithness breed was most deficient, and in which it was of most importance to improve them; and therefore he crossed the Caithness cow with the Galloway bull. But he had not sufficiently thought that although he might bring the rounded form, and larger size of the Galloway bull, he could not bring the mild climate and the fine herbage of Galloway; and experience taught him the truth of the axiom, that the breed must be suited to the climate, or it will not thrive. He improved the size of the Caithness cattle: they were better for the yoke, but they did not fatten so kindly, and their milking properties were even deteriorated.

He then bethought him of the West Highlanders, a kindred race, even though his own were so degenerated; the inhabitants likewise of a cold and variable climate; thriving there, and possessing also those admirable points in which the Caithness were so deficient. The experiment succeeded. On a lowland farm, the Skye cattle grew to a size with which none of the Caithness breed could compare, and they lost not one point of excellence. On a Highland farm they were somewhat inferior in size; but they throve even more rapidly than the others; they made beef of the most excellent quality, and they well paid the farmer for their keep.

Then the Caithness cattle were crossed by the West Highlanders; and at every cross they were improved; and when they had become almost entirely Skye or Argyle blood, they were best of all. The Argyle cattle were preferred for the lowlands—the Skye for the higher and rougher country; and very considerable improvement was effected with regard both to the breeding and the grazing of cattle. The only cause of regret was the distance of the markets, yet the growing excellence of the cattle paid for the length of the journey.

After this, Sir John Sinclair gradually discarded the Galloway even from the plough; and from the Skye, and more particularly from the Argyle breed, he got as quick, and honest, and hardy workers, and profitable fatteners, as he could reasonably desire; and Caithness will not now yield to the neighbouring counties of Sutherland or Ross in the form or value of her cattle.

The peculiarity of the climate of Caithness, and the want of food even to the middle of June, were great obstacles to improvement; to which may be added the same miscalculating avarice which induced the breeders here, as in other counties, to overstock their farms. The want of spring food, however, was, in some measure supplied by the introduction of the rye-grass, which will start early, and in the coldest weather, and afford a bite at least, if not be ready to cut, when nothing else is to be had: and when turnip-feeding was added to this, the improvement of the cattle, and the profit of the farmer became greater; for the beast which had been turnip-fed in the winter, and got rye-grass in the spring, was ready for the

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spirited endeavours to provide for himself and serve the public, ought not to be rendered abortive merely to gratify the indolence of the sloven, who, rather than exert himself in constant acts of industry, is content to live in a hovel, to be clothed in rags, and to feed upon bread and water.'

market a full year before he otherwise would have been. This improved mode of feeding was, however, in the hands of few, and the majority of the cattle were straw-fed in the winter, and had mere common pasturage in the summer; yet even they did well when not overstocked, and yielded a reasonable remuneration to the farmer.

A few beasts are fed for home consumption; but they are generally old cows and oxen which the drovers refuse to purchase: yet at nine, ten, and eleven years old, they will fatten speedily enough, and make good beef. Some are grass-fed in the spring and summer; and the early rye-grass is particularly valuable here. Others are stall-fed, and at the close of the autumn, this is accomplished quickly and without difficulty. Turnips with oat-straw are given at first, and the beasts are finished off with bruised oats and beans, which are said to give firmness to the flesh. The common cattle do not now fare so badly in Caithness as in some other counties. There is more arable ground here than is found farther south; and although the beasts often wander over the commons during the day, they get straw, and, sometimes, turnips in the morning and evening.

In the highland part of the county the attention of the farmer, so far as cattle are concerned, is principally devoted to the rearing of them. That, in fact, is the primitive, although not always the most profitable, business of the Highlander; but in the lower part of the country the care of the dairy is added, or the land is principally cultivated for the dairy. Here a different breed of cows is necessary. It is nedless to repeat that the Highland cattle, excellent as they are for grazing, will yield no remunerating profit as milkers. Sir John Sinclair first endeavoured to cross the native cattle with the Buchan Breed. These were the nearest, and they were excellent dairy cows in their own peculiar district. To a certain extent they answered, but the quantity was not increased so much as been expected, and the grazing qualities were a little impaired. and, the

He next tried the Dunlop or Ayrshire bull. The Caithness became a better milker; but there was something in the character of the Highland beast that would not amalgamate with the lowland dairy blood, for even when on its native ground, it lost much of its propensity to speedy fattening. Many of the pure Ayrshire cows were therefore used in the dairies of Caithness, and they still maintain their ground, either pure or gradually working upon the milking unthriftiness of the Highlander.

The dairy is often managed here in the same unsatisfactory manner as in other places more to the south. The farmer provides cattle and pasturage, but he has nothing to do with the manufacture of the produce; he bargains with some dairy-woman to deliver to him annually a calf for every two cows, and forty or fifty pounds of butter, and the same quantity of cheese for each cow, the value of which may be nearly 5*l.*; but others, and more satisfactorily, and profitably too, take upon themselves the whole management of their property. The dairy has much improved in Caithness; but, on account of its situation and soil, it must always be very inferior to that in the southernmost counties of Scotland. Many of the Orkney cows are used by the small farmers, and for a cottager's cow there are few better.

Including the cattle both for the dairy and grazing, Caithness contains about 15,000. Three thousand of these are annually sold to the drovers, who make their appearance in this county, and begin to hold their *trysts* about the latter end of April. The first regular *market* for the sale of the north-country cattle is at Amulrie on the first Wednesday in May: to this succeeds Cockhill on the 16th, and then Falkirk, Broughill, and Newcastle. The *stots* are usually three years and a half when first offered for sale, and then weigh about twenty stones: when fattened, they will double that weight if of the improved breed; but the old Caithness cattle will seldom weigh more than twenty-five stones, when in the best condition. The price of these *stots* varies with the demand, and the season, and the breed. The old Caithness will frequently not sell for more than 3*l.*; the best Highlanders have brought 8*l.* or 9*l.* per head. The journey from Caithness to Carlisle occupies from twenty-eight to thirty-two days; they are usually taken in droves of about 250, and the expense is nearly 7*s.* 6*d.* per head.

Oxen are yet used in Caithness for husbandry work. The native breed has neither sufficient substance nor spirit; the Galloways are heavier but slow, and do not thrive well in Caithness, and, on the whole, the Highlanders are the best working oxen. A pair of oxen are generally used in the cart. Four were often driven abreast in the plough, the driver curiously walking backward between the central oxen.* A small farmer, now and then, harnesses two ponies with a pair of oxen. The heavier southern cattle have had a fair trial, and are nearly abandoned: and husbandry work, even with the West Highland oxen, is not performed so much as it used to be. The oxen are broken-in at three years' old; at five they are in their prime, and they are worked until eight or ten years; when they are sometimes sold to the drovers in travelling condition, but oftener fattened at home. Their food in winter is straw, or chaff, and occasionally a few turnips; in summer they have hay, but no corn, except the larger oxen; and when they are not at work, they pasture with the milch cows.

It may be supposed that in so ungenial a climate as that of Caithness the cattle are subject to many distempers. The sudden variation of temperature and of food, and the change from starvation to comparative plenty when vegetation does at length, and with strange rapidity, proceed in the latter part of the spring, are the causes of some of the most frequent and fatal diseases. Among the rest is inflammatory fever, known in its various stages by the names of *black quarter* and *hasty*. Superstition is still prevalent enough in all parts of the Highlands, but nowhere more so than in Caithness. Captain Henderson gives some strange accounts of the treatment of these diseases in a country where the name of a veterinary surgeon is almost unknown. He says that 'in former times, when a beast was seized with the black quarter it was taken to a house where *no cattle were ever after to enter*, and there the heart was torn out while the animal was alive, and hung up in the house or byre where the farmer kept his cattle, and while it was there, none of his cattle would again be seized with that distemper.'

When the *murrain* appeared the farmer would send for a *charm-doctor* to superintend the raising of a *need-fire*. A circular booth was erected upon some small island in the nearest river, or *burn;* and in the centre of it a straight pole was fixed, extending from the roof to the ground. Another pole was set across horizontally, with four short arms or levers in its centre to work it rapidly round, and the ends were tapered. One end was exactly fitted into a hole in the perpendicular timber, and the other into some side support. All the neighbours were then collected; they carefully divested themselves of *all metal*—not even a button was left on any part of their clothes—and they set heartily to work, two by two, turning the end of the horizontal timber in the hole of the central and upright one, and rapidly relieving each other as they became tired, until by the violence of the friction, and assisted now and then by a little gunpowder and tinder, the wood began to blaze. This was the *need-fire.* Every fire in the farmer's house was immediately quenched, and others kindled from this *need-fire:* all the cattle were then driven in, and made to pass through the smoke of this new and sacred conflagration, and the plague was at once stayed. Old traditions say that the Druids used to superintend the kindling of a similar fire on the 1st of May. That day is still called in the Gaelic *la-Beal-tin*, i. e. the day of Baal's fire.

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* The Rev. Mr. Jolly, in his Statistical Account of Dunnot (1794), explains this:— 'The tenant's ploughs are generally drawn by four oxen or horses yoked abreast. That practice appears ridiculous to strangers, but a better acquaintance with the people's circumstances would lead to a more favourable opinion. The cattle are very small and ill-fed, and hence their strength is not sufficient for drawing a plough, if they were yoked in any manner where part might have an opportunity of throwing the whole burden occasionally on the rest. This practice, however, is attended with the inconvenience, that one of the cattle must walk on the ploughed ground; of this some are beginning to be sensible, and are substituting three cattle abreast, endeavouring to get those of a better quality.' The ploughman used to walk backward, or with his face to the plough, because he could thus better observe whether the strength of the team was fairly and equally exerted.

A remnant of this superstition still exists among those who lag a little behind in the march of improvement, and they are not a few. When a beast is seized with the murrain a few pieces of sooty *divots* (turf) are taken from a thatched roof (we have said that in some of the poor cottages there is no chimney) and put into a metal pot with a coal of fire, so that a strong sooty smoke ascends. The patient is then brought, and its nostrils are forcibly held in the smoke for a quarter of an hour. Then some ale with plaintain root is given, and the beast is cured. Some interesting resemblances to old customs in other parts of the world, and far earlier times, are evident.

SUTHERLAND.

Sutherland and Caithness form the northern extremity of Scotland, the western coast of which is occupied by Sutherland. The western and northern coasts are bleak and stormy enough, and the mountains, of immense height, have not even a stalk of heath on their barren surfaces; but the south-eastern part of the country is more sheltered, and not a great deal colder, although rather more backward than some of the midland counties of Scotland.

The soil is as various as the climate. There are few or no artificial grasses, and the only natural meadows are the valleys formed by the rivers and burns; on them some cattle are fed, but on the higher ground, in Sutherland and Ross, and the eastern and central Highlands, the black cattle have given way to sheep. Although four times as large as Caithness, this county does not contain twice the number of cattle. It has never been calculated to possess more than 25,000, and, probably, there not now more than two-thirds of that number.

The statistical accounts of the numbers of horses, cattle, and sheep in Sutherland, in 1798 and 1808, will afford a convincing proof of the decrease of horses, cattle, and goats, and the wonderful increase of the sheep:—

	Horses.	Cattle.	Goats.	Sheep.
1798 - -	7736 - - -	24,287 - - -	6227 - -	37,130
1808 - -	4291 - - -	17,333 - - -	1128 - -	94,570
	Decrease 3445	Decrease 6954	Decrease 5099	Increase 57,440

If the value of each were the same at both times, we should find that 20,670*l.* less capital was employed in horses, 32,502*l.* less in cattle, 1532*l.* less in goats, and 34,806*l.* more in sheep. But the manifest improvement in the breed of cattle would materially diminish this apparent difference. How far this may be ultimately advantageous is a question which belongs more to political economy than to a treatise on that part of agriculture which is connected with cattle, and for which we are otherwise not quite prepared, since we have not yet inquired into the nature of the cultivation, and the comparative value of sheep. It cannot be denied that the sheep is the more useful animal—that, in the aggregate, he is reared and kept at the least expense—that the value of the land and the rent of the farm are also enhanced—and that there are millions of acres that may be appropriated to the feeding of sheep, and especially in the rugged and barren parts of the country, which are now in a manner useless. There is one objection, it must be confessed, to the exclusive cultivation of sheep anywhere, and that is the incompatibility between it and a numerous and increasing population. They are things which cannot exist together, and especially not in a mountainous district, like the Highlands, or like Scotland generally. If a quantity of food is raised, sufficient to maintain the same number of inhabitants as before, the same number of hands are not required to procure it. Towns will be multiplied and filled, but the peasantry must be driven from the country, and their character and their occupation must be changed: this will be a work of time—it cannot be accomplished in one generation—and the starving cottagers and the small farmers (for they must give way where sheep husbandry is introduced) have no resort but to emigrate to foreign climes. All this is worth consideration as a general principle, and also as applicable to particular districts.

Entering now, however, on that part of the Highlands, where this new system has been adopted, we are, in a manner, compelled to draw some more detailed comparison between the old and the new way of occupying the land. We will suppose that the proprietor of a considerable district is taking a survey of his property—the produce and the rent, the improvement or deterioration of his land, the character and the degree of happiness of its occupants. What we have already said of the West Highlands, and of Caithness, will prepare us for the result of his inquiry. He traverses some of the romantic Highland glens, and he finds them thickly studded with miserable huts, the occupants of which rent from him little patches of land, for which they nominally pay him an exceedingly trifling sum of money.

Each farm, if so it may be called, consists of a strip of land on the side of the glen, and a larger portion on the hill above. Some of the glen division is attempted to be cultivated to raise a little corn for the winter support of the family. This rarely succeeds; for the torrent pours down and destroys the greater part of the crop long before it is ready for the harvest: and the farmer has seldom sufficient remaining for the support of his family during the winter, and that a long one in such a climate. But he has his black cattle and his goats, and for the short summer months he can send them to the hills, and there, at the shealings, they get fat, and he is happy.

The summer rapidly passes over, the herbage on the hills is all consumed, and he and his cattle return to the glen. The grass had in the mean time grown there; it had ripened for hay; some of the family had been sent to mow it, and he has a little stock awaiting his return. It is a little one, and barely sufficient for his *cows and his calves.* His growing cattle have nothing but the straw of his half-destroyed oat crop, on which they are to starve during the winter—and starve many of them literally do—while the rest are mere walking skeletons, and, for a while, comparatively worthless.

What becomes of the rent?—why it is paid when the tenant *can pay* it. but that is not regularly, and often not at all: on the contrary, the landlord has to supply his tenant with necessaries, and to half-maintain him during a great part of the year; and his land is all this while becoming impoverished, worn out, and valueless.

This was the actual state of things. How was it to be remedied? Why, only by the introduction of a new system of husbandry; by introducing stock of another kind, which would longer feed on the upland pasture—which, with some help, would feed there all the year round; and, by leaving the greater part of the lower ground for the feeding of the milch cattle, for the growing of corn, and for the preparation of winter food; and which would be ready and in its prime when it was most wanted; in short, if not entirely to substitute sheep for cattle, yet to make them the principal objects of the farmer's care.

Would the Highlander consent to this?—would he give up his *shealings*, the joyous time of his miserable year?—would he abandon those customs and modes of management which had been practised by his forefathers time out of mind?—Never! Then it was necessary to introduce a new race of men to accomplish this; and that was attempted, in despite of the prejudices, and violent opposition of the people.

The new settlers were at first maltreated: the inhabitants gathered from every part; they broke down the fences; they got together thousands of the new sheep; some they forced into the lakes and drowned, and the rest they drove triumphantly to the edge of the county, there to be delivered over to the mob of the next district, until they were expelled from the Highlands, or had perished by the way. The laws of the country were successfully appealed to; the violence of the mob was suppressed; and the new system was left to feel its own way, and to stand or fall as it might deserve.

It has weathered the storm, and is now the established system of husbandry in most of the Highland districts. Sheep now cover the hills on which the half-starved stot and goat formerly wandered. The deer-forests, which had not then been intruded upon—which were perfect deserts—have been brought under a certain degree of cultivation; the mountains, which were depastured for a few months and left waste for the rest of the year, are now grazed all the year round; and the low lands, freed from that which impoverished it, and which it could not support, yields plentifully for man and beast. The cattle, far from being banished, are somewhat reduced in number—improved in quality—fatter, and happier—fully equal to the demand—far more profitable to the breeder, and only confined to those pastures on which sheep could not be safely fed. The population is certainly not so numerous, but it is of a different character—more intelligent, more industrious, more respectable, more useful; and the remainder have either sought employment in the south, or emigrated to America or some of the British colonies. The value and the rent of the land is trebled—quadrupled; and the tenant can pay it, which he could not before: while in a national point of view, the addition of food, the increased value of stock, and the unprecedented supply of the raw material for one of our most important manufactures, are circumstances of immense importance.

Having taken this cursory view of the change in the system of agriculture, as it regards cattle, we can proceed more rapidly.

The native breed of Sutherland is much smaller than that of Caithness, but far more valuable, and requiring only to be crossed by those from Argyle and Skye, to be equal to any that the northern Highlands can produce. It is much to be lamented that the Argyleshire cattle in the possession of the Marquis of Stafford, at Dunrobin, have not been more employed in improving the breed of the surrounding districts. The best cattle are to be found in the neighbourhood of Dunrobin and Skibo, on the eastern coast; and most of them are the pure Argyle or Skyes, or crosses between the Sutherland cow and the West Highland bull. At Skibo, in particular, a small breed is carefully preserved, which is much sought after for its superior propensity to fatten; and although they do not often weigh more than fifteen stones, their flesh is little inferior to venison. Some of the Skibo cattle have been raised, in southern pastures, to more than treble that weight.

Assynt, on the south-western coast, is celebrated for its cattle, of the pure West Highland breed, or, if occasionally with one cross of the native Sutherlands, not injured by that mixture. They are not larger than the Skye cattle; but they are hardier, short-legged and well shaped. A great many other breeds have been tried, as the Galloways, the Fifes, the Banffs and the improved Leicesters; but none of them have answered so well as the West Highlanders, or crosses between them and the natives.

Some of the little islands on the coast afford very good winter-pasture for the cattle. Oldney contains some valuable pasturage of this kind, which is strictly preserved during the harvest, and on which the cattle are turned some time in November, and gradually taken out to be housed in the beginning of spring, or when they may appear to need provender. Some of the cattle, however, are lost every year by attempting to climb to little plots of grass among the rocks, with which the coasts of the islands abound.

Very few cattle are fattened, but only got into good travelling condition for the drover. The four-year-old improved stots will probably weigh 36 or 40 stones; the country cattle not more than from 18 to 20 stones.

The manner of feeding is the same as in Caithness, and the shealings used to be of the same kind. The sheep now have left but little upland feed for the primitive pastoral life. In the winter most of the cattle are housed at night, and fed with straw, and turned out into the fields during the day; and, on the whole, although the system of stocking is much to be complained of, the cattle are not subject to all the hardships which are so injurious to them in Caithness. When, however, it is considered that in many parts of Sutherland the cattle are not merely in the next room to the owner, but actually enjoy the fire in common with the family; and then, in the morning, however cold or wet that may be, they are driven out to wander in the fields, it does not admit of much doubt that they must be seriously injured by the sudden transition. In the neighbourhood of Dunrobin, they are not housed at all, not even the calves after they have been weaned, nor the cows except at calving time.

Mr. Sellar gives the following account of the management of cattle on the northern coast of Sutherland (Farmer's Series—Farm Reports, p. 75):— 'The grazing cattle are all bought in from the people who are settled round the shores of Sutherland, in small lots of land, for the prosecution of the herring-fishing. These people have one, two, or three cows each: they sell the calves at from nine months to a year old. The tillage farmer buys them, and prepares them to travel south. He purchases them in April, puts them during smmmer, on his superabundance of *deer-hair*, transfers them in August, to certain coarse rushy loams, where coarse grass grows; brings them to his *courtines* to eat straw in winter, and finishes them off for the road during the next summer in the inclosures above-mentioned. With some little assistance from the field appropriated to the horses the four fields summer, on an average, one beast and a half per acre. It is the practice to fill up two fields with three cattle per acre, and to shift them once a fortnight.' The sales for the southern market take place in July, August, and September, and the fields are then cleared, in order to prepare them for sowing wheat.

The dairy is a minor consideration with the Sutherland farmer; and he only manufactures butter and cheese enough for his own consumption. The quantity produced will not exceed 70 lbs. of butter per year, and the same quantity of cheese from each cow, and one calf reared between two cows. This is a small quantity compared with what some of the southern cows yield; yet it is not often that the Sutherland dairyman gets so much as this.

There is the same superstition among the peasantry as in the other Highland counties; and when sometimes, as will naturally occur in so barren a country, and under such absurd and injurious management, the cow yields little milk, or becomes suddenly dry, Mr. Pennant, in his 'Second Tour to Scotland,' tells us, that 'when the good housewife perceives the effects of the malicious one on any of her kine, she takes as much milk as she can drain from the enchanted herd; for the witch generally leaves her very little. She then boils it with certain herbs, and adds to them flints and tempered steel. This puts the witch in such agony, that she comes *nilling-willing* to the door, and begs to be admitted to obtain relief, by touching the powerful pot: the good woman makes her own terms; the witch restores the milk to the cattle, and is, in return, freed from her pains.'

Oxen are employed to a considerable extent on the coast of Sutherland for road-work, and for the plough on many of the farms in the interior; but they are getting somewhat out of use: they are never shod.

ROSS AND CROMARTY.

These were originally distinct counties; but Cromarty was so small, and the additions that were made to it were in such detached portions, and so scattered over Ross, that it is now, for the sake of convenience, and almost of necessity, considered as amalgamated with Ross, and the two constituting but one county. The climate, like that of most of the Highland counties, is moist, but considerably warmer than that of Caithness or Sutherland. The meadow-ground is of small extent, and usually reserved for winter-feed for the cattle, and comparatively little of the arable land is laid down for permanent pasture. The eastern part of Ross and some portion of Cromarty contain excellent soil; and not only the wheat but the turnip husbandry is carried on extensively and successfully. The system is more connected with sheep-feeding than with either the breeding or rearing of cattle.

For many excellent observations on the character and management of the Ross cattle, we are indebted to Sir George Stewart Mackenzie's able survey of that county and Cromarty. It is a model of what agricultural surveys ought to be.

Ross may be divided into the low and high country: the former occupies the eastern coast and district, and the latter the western part of the county. The cattle which are kept in the lowlands are principally for the dairy, and they are a mixed breed. There are many pure West Highlanders, but not so small as the common breed of cattle in the counties farther north, but there are more of the native cattle, with various degrees of crossing; and others have the Fife and the Moray, and crosses of every kind with them. The dairy, however, is not attended to for profit here;

but the farmer must have milk and butter and cheese, and he must also have cattle to eat down the grass where he does not dare to turn on his sheep. The Leicesters have been tried, but they did not answer for breeding or for the dairy. There is a singular practice prevailing in Ross. On some parts of the sea-coast the cheeses are buried separately within the high-water-mark for several days, in order to give them a blue colour, and a rich taste.

On the western coast the pure West Highlanders prevail, and this is decidedly a breeding district. Next to the pure West Highlanders, is a cross between them and the small, well-haired, hardy cattle of the country. The best cow for the dairy is here supposed to be produced from that of upper Fife, crossed with the true Highland bull: she will generally yield four gallons of milk per day—is easily fattened, and will weigh from 120 to 140 lbs. per quarter. They are a middle-sized, strong, compact, hardy race, well suited to the general means and climate of the country; but they are very apt to degenerate, and, after the third or fourth generation, will often be little better than the common country cattle. The cattle of Kintail, called, on this account, *Kintail no Bogh*, Kintail of cows, are celebrated all over the highlands. Some say that they are the progenitors of the Argyle breed; but we are more inclined to trace them to the Skye cattle, to which they bear great resemblance, and, like them, they are smaller than the Argyles. Their distinguishing and favourable points are, short legs, a thick pile, and weight in proportion to their apparent size. In the neighbourhood of Kilmure there used to be a peculiar breed of cattle, the result of a cross between the Fife or Aberdeen and the Highlander, and a cross that added to the size and value of the beast.

Before cattle became so valuable in this district it was customary, as in some other parts of the Highlands, to allow one calf to suck two cows. The foster-mother was easily reconciled to it after it had been covered a few times with the skin of her own that had been slaughtered; but now each cow rears her calf. The young ones are suffered to suck for four, five, or six months, according to the time at which they were dropped—a part of the milk being previously drawn for the dairy; but the cow will take care that too much shall not go, for, after the dairy-maid has wrung the last drop she can extract, the mother has retained more than enough for her offspring. The latest of them are weaned in the early part of November; and all are then sent to the best pasture until the winter begins thoroughly to set in; when they are housed, and fed, as the farm will afford, on oat-straw and hay, to which turnips or potatoes, and particularly the former, are occasionally added. On the following spring they are sent to hill-pasture; and in the winter are brought home to the grounds which had been occupied by the milch-cows, and are fed, if necessary, with straw and hay. Thence, in the spring, they are removed to the coarser grass of the farm, and still occasionally fed, if needful; and on the approach of the third winter they once more follow the cows in the reserved and best winter pasture of the farm.

The overstocking of the farm, although now sometimes to be complained of, is not carried to the ruinous extent to which it used to be; and if the farmer has fewer cattle for the drover, they bring him more money: they are at once fit for travelling, and he has escaped the serious losses which used to annoy and cripple his predecessors.

The cattle are usually sold at three and a half and four years, and drovers come from Perth, and Sterling, and Dumbarton, at the latter end of March, to purchase them. The *trysts* and markets continue here until September, when the cows come into request. So much business, however, is not done at these public meetings as in some other counties; but the drovers go from farm to farm, and the sale is effected privately.

Mr. Baigrie, who wrote the account of Ross-shire in No. 18 of the Farmer's Series, informs us that the first regular market for the sale of the north country cattle is the 'Stafford Market,' which is held at Clashmore, in Sutherlandshire, on the Monday after the first Wednesday in May. The second is held on the Tuesday following at Kildary in Ross-shire, and the third at the Muir of Ord, on the confines of Inverness and Ross-shire, being the first of the series of great cattle-markets held monthly at the latter place during the season. The cattle from all these early markets proceed to Cockhill.

The weight of the stock from three to five years old may be averaged at 70 or 80 lbs. per quarter, but he will fatten to 110 lbs. The cow, when lean, will weigh from 60 to 70 lbs. per quarter, and will likewise fatten to 100 lbs.

Very few beasts are fattened in any part of Ross; and the few that are so consist of old oxen or cows, and principally for the supply of Inverness and Fort St. George. For home consumption the West Highlanders are preferred; but the spare turnips are mostly used in bringing forward young cattle.

Oxen were formerly more used for husbandry in the eastern part of the county than they are at present. They were not reared in Ross, but purchased at the different fairs in this county, or in Sutherland. After some years' work they were generally sold to the grazier or the butcher at a higher price than that at which they were bought. Where oxen are now used generally there are four to a plough, or four oxen and two horses. On a stiff and stony ground six oxen were occasionally used. The four oxen cannot well go without a driver, but it is sometimes attempted. The pair used for the harrow, on very light land, do not require a driver. Curious stories were formerly told of the medley of horses and oxen and cows harnessed to the ploughs of the small farmer. Oxen are rarely used on the road.*

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* Since this sketch of Ross-shire was sent to the press, we have been favoured with a valuable account of the cattle of this district and their management, by Mr. Mackenzie of Milbank, near Dingwall. It strongly corroborates our main points; but at the same time giving a different illustration of a few particulars, we deem it right to present it to our readers.

'Although it is difficult to trace the history or true pedigree of the old Ross-shire breed of cattle, the various accounts that are handed down regarding it show that it has long existed as a separate and distinct one. The breed taken collectively, or as it may be termed the north Highland breed, is exceedingly hardy and of very compact form. It is comparatively light in form, but the bone is fine, and the carcass is deep and lengthy, it is round in the barrel, straight in the houghs and back, with a pile stronger and more closely laid than that of almost any other breed. The head is generally light, with broad forehead, short shaggy ears, and well-turned horns; and they are of all colours, but black and brindled predominate, and are the favourites, as indicating most healthy constitutions.

'No description of cattle answers the soil and climate of Ross-shire so well as the original north Highlanders; but as a considerable part of the county is very highly cultivated, producing every variety of feeding, and fit for the reception of any kind of stock, several crosses have been introduced, and some with advantage. Of these, a cross with the Aberdeenshire horned cattle has produced very superior stock, both in point of symmetry and weight, and for the use of the dairy. For the latter purpose, a cross with the Ayrshire is often made; but that is found advantageous only in situations where there is great profusion of grass and turnips in their season; and the stock produced from it is coarse, and not in demand either for feeding or driving. That which is most successfully followed by the extensive breeders of the county, is a cross from the Argyleshire Highlander, which is of greater weight and size than the cattle of the north: but in availing themselves of this cross, the Ross-shire breeders are always anxious to preserve as much as possible of their own stamp, because it is more hardy, more suited to their pastures generally, and in

THE NORTH-EASTERN DISTRICT.

This district extends along the eastern coast from Murray Firth to the Firth of Forth, and there is a general resemblance between the cattle in

more general demand for driving to the south. There are a few graziers in Ross and Inverness-shire who cross their cattle with superior bulls from the west Highlands of Perthshire, which is found to answer equally as well as, if not better than, any other yet introduced in that part of the country.

'The Ross-shire cattle, as already described, are decidedly more adapted for the grazing than the dairy system. The cows, particularly those pastured on hilly grounds, outfield or meadow, are not famed for the quantity of their milk, although it is extremely rich in quality; and as there are comparatively but few cattle-farms now in the county, dairy produce does not form an article of export, or of which money is made. The produce of an ordinary country cow may be computed, during five months of the year, at from five to seven Scotch pints of milk per day, and from four to six pounds of butter with rather more than that quantity of cheese, in the week.

'Grazing, as the more profitable course, is what is followed, and there being but little encouragement for feeding, the cattle are chiefly sold to the southern dealers at two and three years old; and such of them as have been kept for some time by the agricultural farmers of the county, and brought to their full growth, are as fine animals as can be produced anywhere. It also very often happens that the breeders dispose of their young stock to the graziers and farmers at the age of six quarters, there being many farms calculated for breeding that have not advantages for rearing, and *vice versâ*. A well-bred Ross-shire bullock of three or four years old, when fully fed, will weigh twenty-five stones, of twenty-one pounds Dutch; but though it rarely brings a remunerating price to the feeder at home, the breed is reputed for quick feeding and for yielding more tallow in proportion to size than most others, while it is ascertained that when they arrive on the pastures of the south, they compete in point of profit with any kind whatever.

'Of all the cattle that are sent out of Ross-shire, those of the island of *Lewis* (from which three thousand are annually exported) are most sought after for the table, from the fineness of their quality. Though of less size, and less prepossessing in appearance, than most other cattle, their beef, which is always marbled, is esteemed as being very superior; and they are so hardy, that in driving even to the most southern parts of England they rather improve than lose in condition, if properly attended to.

'The system of managing a breeding stock of Highland cattle is simple, but very interesting, and a thorough knowledge of it, at the period when it was most extensively prastised in Ross-shire, was confined to the natives of its pastoral districts, and formed their peculiar element. This was about twenty or twenty-five years ago, when one-half of the county was under black cattle, in farms carrying from twenty to sixty breeding cows, of a stamp so equal as to be always distinguished at market. The principal and leading points of management consist in particular attention to pedigree; in a careful disposal of the stock upon the farms; and in the various arrangements connected with their food, whether in storing up the produce of the meadows, or in the appropriation of the pasturage to the different seasons, scrupulously reserving the roughest grasses and more sheltered portions, for the fall of the year, when it is of great consequence to have the stock of Highland farms kept in condition.

'The establishment necessary for a breeding fold of cows is generally composed of an experienced principal herdsman, known by the name of the 'Bowman,' whose wife is head dairy woman, with female assistants, at the rate of one to twenty cows, and herd-lads in the same proportion, and some younger followers to tend the calves, during the intervals of separation from their dams. It is customary, on extensive farms, to have 'sheal bothies' erected at different stations, for the temporary accommodation of such an establishment, when it is necessary to move the cows from place to place in order to give them the benefit of the whole grasses in due season; and as undivided attention is bestowed on the charge, very superior stock is bred in this manner. The mode of rearing calves, under such management, is by suckling, and not by hand-feeding—that is, by allowing them to suck a certain portion of the milk at stated periods in the mornings and evenings. The common way is, to allow the calf to suck two teats, while the dairy-maid, at the same time, milks the other two; or else to allow the calf the use of the whole, at the discretion of the dairy-maid. Both calves and cows are found to thrive much better in this way than by allowing them to run constantly together; and besides, there is the advantage of so much extra dairy produce. This mode of half-suckling prepares them likewise for their winter-feeding; and the process of weaning generally takes place towards the end of October. Having been weaned, the stirks, as they are then called, are put up for the winter, generally loose, in large byres, and fed on the finest of the meadow hay; and as turnips are not frequently grown to any extent on the large pastoral farms of the High-every part of it. They evidently belong to the West Highlanders, but the difference of pasture has given them a larger form. We will commence at the north, and proceed downwards.

NAIRN.

This is a small county lying between Inverness and Elgin, and having the Murray Firth on the north. It does not contain many more than six thousand cattle, and about double that number of sheep. Towards the borders of Inverness some of the pure West Highlanders are found, but mixed, on the lower grounds, with the Fife and with other varieties. Formerly the whole of the husbandry work in this county was performed by oxen, and then the object of the farmer was to obtain a stronger and heavier breed than the native one, or the West Highlanders. That object was, to a certain degree accomplished, but the beast became coarser, and did not fatten so kindly, and even its qualities as a milker were not materially improved. Very few pairs of oxen, however, are now seen, and the farmers have gone back to the native and smaller, but more valuable and profitable breed. The Isle of Skye bulls have been in much request, and being crossed with the best cows, there are, in the higher parts of the county, as fine specimens of Highland cattle as any part of Scotland will produce; the colour is not so uniform, but none of the good points or qualities are lost.

Nairn is a breeding and rearing district. The early cattle, as they get into tolerably good grazing condition, are sent to Banffshire, where the fairs, in almost every village, succeed one another from the spring to the

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lands, a run or outgo during the day, on the roughest of the pasture, supplies their place. The cows, after being separated from their calves, are sent to the portion of the farm that has been set apart for a general wintering; but when calving time approaches, or when the season is very severe, they are again brought near to the byre, fed from the barn, and treated with much care. The winter and spring being past, the year-olds are generally put upon low-lying haugh or woodland pasture, while the stronger part of the young stock is sent to graze on the higher and more remote pendicles of the farm, to await a sale; special care being taken to select and retain such of them as are best calculated for supplying the place of the draft of aged cows annually made from the fold, while as many young bulls are kept as will afford a choice.

'The breeding of cattle in Ross-shire, however, has decreased very much, and the breed, generally speaking, has become much deteriorated within the last twenty years, owing to the rapid extension of sheep-farming. Sheep have, in fact, become the staple commodity of the North Highlands, and the system is attended with less expense, and affords, perhaps, a more certain return than any other to the occupier of the land. But although the greater part of the pastoral districts of Ross-shire is best adapted for sheep, it is the opinion of many persons of experience, that, from the almost universal breeding of that species of stock, cattle would pay fully as well in situations where equal justice as to keeping could be afforded in winter as in summer. So great is the preference given to sheep now in Ross-shire, that the breeding of *fine* cattle is almost entirely confined to the amateur proprietor, and a few tenants, who still maintain opinions differing from those of the shepherds, who have acquired by far the greatest part of the lands. Still the number of cattle, of all descriptions, bred within the county is very considerable, but though the greater proportion of them are of the native breed, they have become diminutive, from there being but little reservation of hill ground made in their favour, and from being consequently excluded from the pastures that produce most bone and constitution. The system of throwing several cattle-farms into one sheep-walk has limited the breeding of cattle generally to tenants of small holdings, in the least favoured situations, and to cottars placed either along the shores, or on the outskirts of the larger tenements; and from wanting good bulls in such situations, joined to other disadvantages, the breed, though it retains the original character, has greatly fallen off.

'Upon the whole, therefore, there is at present a great decrease and a general deterioration in Ross-shire cattle; but many of a superior description are still bred in the county, while the greater number of the whole are of the original stamp.'

autumn. The small farmers adopt the same system of overstocking and false economy which we have so often reprobated, and their cattle are seldom got into condition before the autumn, when they are disposed of in the same manner.

The dairy used to be sadly neglected in Nairn, and even now it is regarded as an object of only secondary importance. The Rev. Mr. Leslie gives a curious illustration of the extent to which this neglect was carried: he tells us that considerable quantities of butter and cheese are brought from Banffshire and even from Cheshire and Gloucester; and that, so late as 1770, on many farms along the coast, no better way of making butter was known than by a woman whisking about the cream, with her naked arm, in an iron pot.

ELGIN, OR MORAY.

The Elgin breed of cattle is undoubtedly the Kyloe improved, or, rather, raised in size by good keeping, and crossing with Aberdeenshire horned bulls, and by the great number of Buchan cows brought over as milch cows. They are of an intermediate size between the Aberdeens and Kyloes, a hardy breed, more adapted for grazing than for the dairy, affording beef of the finest quality, but scarcely of the size that would be desirable.

Mr. Wagstaff informs us that some short-horned bulls have been lately introduced, with a view to the production of an animal that will attain a greater weight. There has not, however, been time to ascertain the result of the experiment, but a previous cross with the Galloways did not answer the expectations of those who tried it. The cross with the short-horns, if it succeeds, will effect two very important objects, and in which the Highlanders are deficient—increase of weight, and earliness of ripening. According to Mr. Deuchar, by whom we have been favoured with some valuable remarks, the Moray or Elgin cattle have more of the Aberdeen about them than of the Kyloe; but they are neater and more compact than the Aberdeens, and have of late greatly improved in consequence of the premiums given for breeding stock by the Morayshire Farming Club and the Highland Society.

Very few are full fed in their native district, being too far distant from the large markets. A four-year-old, stalled in winter and fed on straw and turnips, will average about 45 stones. Some oxen that have been worked until seven or eight years old, have weighed 70 or 80 stones. Very few, however, are brought to perfection in Moray; but after having been stalled during the winter, or put into a straw-yard, and fed on straw, with as many turnips as will keep them in tolerable condition and fresh for grass, they are generally sold to the Aberdeen and Angusshire graziers in the spring, as soon as the grass is ready. Several cattle have been recently full-fed in the neighbourhood of Elgin, particularly by Mr. Peter Brown, of Linleswood, and conveyed to Smithfield by steam-vessels from Aberdeen. Steam navigation will probably, ere long effect, a material alteration in the system of breeding and feeding in the maritime counties of the west and north-east of Scotland.

The calves are suffered to suck until they are weaned. In winter they are kept in the straw yard, and fed on straw or turnips, and in the spring turned to grass. The queys are not allowed to have calves until they are three years-old, and are fed off at six or seven.

The straw-yard, with the same quantity of straw and turnips, is, in this district, thought to be preferable to stall-feeding. The cattle-dealers imagine that the beasts stand the road better, and especially in case of bad weather happening when driving south. The dealers also complain of the crosses with the Galloway and short-horn, the progeny not being sufficiently hardy to drive to the distant markets.

Sir John Sinclair, in his general report of Scotland, computes the number of cattle in Elgin at 16,900. There are, probably, not so many at present, more of the land having been enclosed and submitted to the plough.

BANFF.

This county, lying between Elgin and Aberdeen, contains nearly 25,000 cattle, the ancient and still preponderating breed of which is the Aberdeenshire horned, the qualities of which are well known to, and appreciated by graziers from the Firth of Moray to Smithfield. The Banffshire cattle are somewhat smaller, however, than the Aberdeens, and of finer symmetry.

Very few true specimens of that hardy and valuable breed, the old Banffshire cattle, are now to be met with, except in some of the upper districts of the county; and even these, from the shortness of keep and the want of turnips, in winter are considerably stinted in their growth. Mr. Tatt, veterinary surgeon at Portsoy, to whom we return our thanks for some valuable information, says, that 'Any of the old breed that are to be seen in the better cultivated districts are very handsome animals; for the most part with fine springing white horns with black points, fine small heads, but broad between the eyes, and with short clean muzzles. They are short in the legs, clean in the bone, and the flesh well down upon the legs. The body is rather long, the ribs round and the back broad and straight; the colour, for the most part, black or brindled, party-colours being rarely met with in the native breed. They are hardy, superior travellers, and at four years old will weigh from 50 to 60 stones.'

The cows are not celebrated for the quantity of milk that they yield, but it is usually of very superior quality. From three to five gallons of milk may be reckoned the average produce on good pasture and in the prime of the season.

Banff is principally a breeding country; a few oxen only are worked in the upper part of the district;* on the coast some cattle are prepared for the Mearns and Aberdeen markets: most of them are sold half fat; but a few are finished off with turnips and hay. Mr. Mill, tenant of Mill of Byndie, near Banff, feeds a considerable number of beasts full-fat, which he sends to Smithfield by the smacks from Portsoy and Banff, and by the Aberdeen steam-vessels. There are some good artificial pastures about the coast, but in the upper part of the country there is little beside the natural herbage, and that not often improved by manure. Banffshire is indebted to Lord Findlater for the greater part of the improvements that have taken place in that district. When his Lordship first took up his residence in Banff Castle, about the year 1753, there were no roads, no turnips or potatoes reared in the field, no grass-seed sown, and no inclosure made, except about the mansions of a few of the proprietors. He first took into his own possession one of his farms (Craigherbs) near Banff Castle, and fallowed and limed it, and laid down part of it in turnips, and part of it in grass-seeds. He sent the sons of some of the farmers to study agriculture. As soon as the lease was expired, he commenced the management of another of his farms; he raised better and constant food for the cattle, he improved the breed by crosses from the best of his own stock and the neighbouring districts, and the agriculture of Banffshire, about the lowland part of the country, is now equal to any in Scotland. The local Agricultural Society has also been of great service in carrying on the work of improvement; and the facilities afforded by steam passage will, in Banffshire, as in all the counties on the coast, give an additional stimulus to improvement, and effect a rapid change, both in the breeding and management of cattle.

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* The old Banff plough used to be drawn by six, or eight, or ten oxen, or by oxen and cows intermingled, or by oxen and horses. The black cattle were usually bought in about Whitsuntide and sold again in the autumn.

The lowland farmers sometimes buy young cattle at two years old from the small upland farmers, and sell them again at three years. Their food in the winter is almost entirely straw and turnips, a little hay being added for the cows that have calved. The cattle of the lower districts of Banffshire are of a medium size, between those of the native Highlands and the better fed ones of Kincardine.* Mr. M'Pherson, factor to the Duke of Gordon, informs us, that about thirty years ago the Galloway breed of cattle was introduced into this district, and has increased so much, that it now forms a large portion of the heavy stock; some of the Buchan cattle, also polled, but a distinct breed, appear in some of the districts of Banff; they are devoted to the purposes of the dairy. Many of the farmers crossed the Banff with the polled breed of Aberdeen, in order to obtain greater weight, and which was warranted by the superior system of husbandry that has lately been adopted in the greater part of the county; and they also reckoned, but not with so much reason, on the early maturity of this cross. Others, and at the head of them stands Mr. Milne of Mill Boyndie, and to whom also we owe much obligation, has all his cows of the Banff breed, crossed with the Isle of Skye bull. Mr. Milne considers this to be the most valuable stock that the country produces.

A few Ayrshire and Teeswater beasts are likewise also seen. A shorthorned bull was lately introduced by Mr. Wilson, of Brangan, whose stock is promising. There is much prejudice against the short-horns at present in Banffshire. It is supposed that the keep of this district can never be good enough for them, and that the greater price, in proportion to their weight, fetched by the native stock, would yield greater profit to the farmer than he could obtain from a heavier and more expensively fed beast. To a great degree this is an unfounded prejudice; and we have no doubt that in Banffshire, as every where else, the short-horn, cautiously and judiciously introduced, will ultimately have justice done to him.

Much injury is supposed to have been done to the Banffshire breed of cattle by the attempted introduction of the long-horns, forty or fifty years ago. A cross with these, and especially when persisted in, produced an ill-framed, unshapely animal, in which every good quality of the progenitors was lost. Among the most intelligent and successful breeders in Banffshire we may reckon Mr. Gordon of Laggan, Mr. Gauld of Edinglassie, and the late Rev. A. Milne of Boyndie.

Although horse-ploughing has superseded ox-labour, the number of cattle in Banffshire has materially increased since the establishment of the system of winter feeding.

ABERDEENSHIRE.

THIS extensive county, breeding or grazing more cattle than any other district of Scotland, will require particular attention. The number of cattle in Aberdeenshire has been calculated at 110,000, of which more than 20,000 are either slaughtered, or sold to the graziers every year.

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* Mr. Ballingall, in his Statistical Account of Forglen, says, in 1795, that 'on the waterside, the cattle, by the richness of the pasture, are of a large size. One tenant in Eastside had a plough of eight oxen, which would, in most seasons, have been good beef from the yoke, and would have weighed from fifty to seventy stones, at an average, and, if full-fed from seventy to ninety, and some seemed size enough to carry one hundred.'

The soil and climate are very different in the hilly country towards the south-west, bordering on Forfar, Perth, and Inverness, and in the lowlands skirting the sea. There is better natural pasture on the hills than the Highlands usually afford, except upon the very ridges of the Grampians, while the mellow clayey soil in the lower parts yield abundant crops. The climate on the hills is cold enough, and especially when the wind blows from the north-east; but in the lowlands there is a mildness and an equality of temperature, scarcely exceeded in the south-eastern parts of England. Storms from the north and the east, however, sometimes do considerable injury, and especially in the district of Buchan, and when the crops are in bloom.

The character of the cattle varies with that of the country. Towards the interior, and on the hills, formerly occupying the whole of that district, and still existing in considerable numbers, is the native unmixed Highland breed. It is suited to its locality: hardy but not docile; living and thriving, to a certain extent, on its scanty fare; and at four years-old, and when it was thought to be prepared for the dealers, weighing, probably, not more than 3½ cwt.; but with a disposition to grow to the full extent of which its natural form is capable when conveyed to the richer pasture of the south.

This breed, however, would be out of its place in the milder climate and more productive soil of the lower district of Aberdeen; another kind of cattle was therefore gradually raised, the precise origin of which it is difficult to describe.

It was first attempted, as in the districts that we have already surveyed, by judicious selections from the native breed, and some increase of size was obtained, but not sufficient for the pasture. Some spirited individuals then sent far south, and the Lancashire long-horn was introduced, and the short-horned Durham was tried; but either they did not amalgamate with the native breed, or a species of cattle was produced too large for the soil.

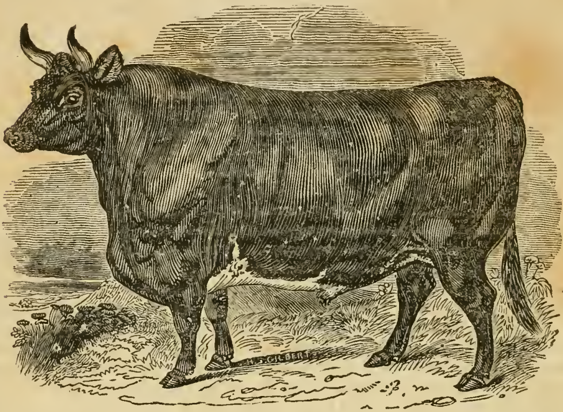
There were, however, some splendid exceptions to this, and we are glad that we can present our readers with a portrait of one of them in two stages of his preparation for the market.—(See p. 104 and 105.)

This beautiful animal was bred by Lord Kintore from an Aberdeenshire cow and a Teeswater bull. We are indebted to his lordship for the chief materials of our history of him. He was calved in April, 1827, and from the Michaelmas of that year he was tied up in the house, according to the practice of the country, with the other calves. He got turnips, with clover, hay, and straw alternately twice a day. They were the Norfolk globe turnips, which are not considered so nutritious as the Aberdeen yellow; and four or five ounces of salt were given him daily.

In 1828 he was at pasture from the 1st of May to the 20th of October, and was then put into a straw-yard with sheds, getting about five pounds of oil-cake daily, with plenty of water and hay and straw, until the 10th of May, 1829, when he again was sent to pasture until the middle of October. He then got a limited quantity of Aberdeen yellow turnips in the house, as Lord Kintore did not then intend to have him fed off. He went out almost daily for water and exercise until the 1st of April, 1830, when he was again put into the straw-yard until the middle of May, getting about six pounds and a half of oil-cake daily, with the usual quantity of hay and straw.

He was afterwards at pasture until the 8th of October, and was treated in the winter as before, with the addition of oil-cake for about ten days, previous to his being again turned out to grass, which was on the 15th of May, 1831.

From the latter end of June until the close of August he was taken into the house during the day, where he got cut grass, and was turned out at night; and from that time until the 21st of September he was again tied up, getting hay and turnips until the 6th of October, when he left Keith Hall, and was sent by the steamer to London. His weight might have been considerably increased had he been full fed from the first, but he was now a very fine animal, as the cut, from a portrait of him by Cooper, very kindly lent to us by Mr. Combe, will sufficiently show. He was now supposed to weigh 100 stones imperial weight, or 175 stones Smithfield weight.

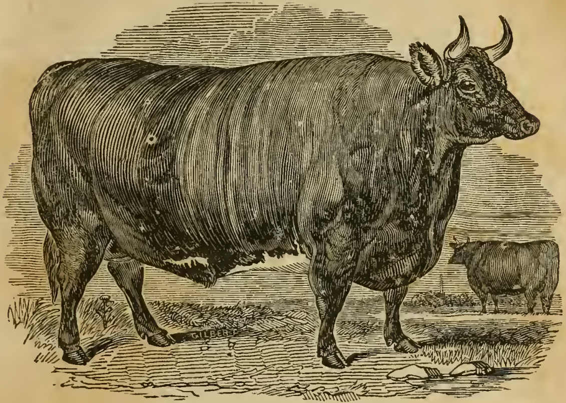


[*The Kintore Ox, when he was first sent to the South—a Cross between the Aberdeen and the Improved Short-horn.*]

He was consigned to the care of Lord Kintore's friend, Mr. Harvey Combe, who was to use his own discretion whether he would exhibit him at the next Smithfield cattle-show, and compete for a prize among the extra stock, or whether he would keep him another year, and try for the first prize. Mr. Combe decided, and very judiciously, to give him another year's feeding. He was accordingly taken down to that gentleman's estate at Cobham; and from October to April was fed upon Swedish turnips and hay, with about six pounds of oil-cake daily, and during the spring and summer he had cut grass and oatmeal. He was let out daily for exercise, and his greatest pleasure seemed to be to go among the cows as they came into the yard, and talk to them. He was exceedingly docile. Whoever approached him or handled him he scarcely moved, except that he would not suffer the man who was once compelled to bleed him to come near him for a week.

In September he commenced oil-cake and hay, eating about twelve pounds daily of the former, until he was sent to Smithfield. During the last two months he had a lump of rock salt in his manger, of which he was particularly fond. A basket of earth also stood by him, of which he occasionally ate a considerable quantity, and which operated as a gentle purgative.

The following cut, taken from a painting by the same artist, contains an accurate portrait of him just before he was sent to the Show.



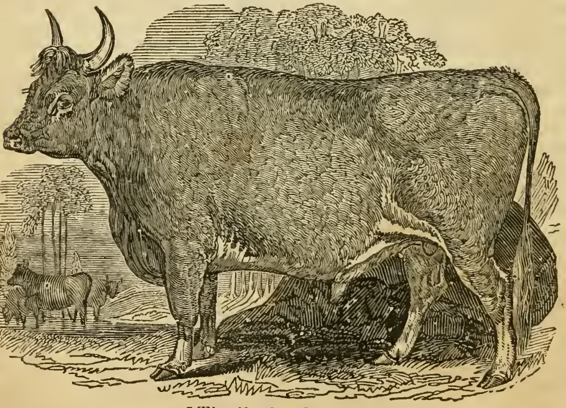
[*The Kintore Ox, fatted.*]

He was supposed now to weigh more than 180 stones imperial weight, and nearly, or quite, 320 stones Smithfield weight. He was universally admired, particularly his still beautiful symmetry, the equable manner in which the fat was laid upon him, and his almost perfect levelness from the shoulder to the tail.

In the mean time the regulations of the Smithfield Club with regard to the age of cattle had been altered, and this noble animal was now a year too old, and consequently could not compete for any prize. This was a serious mortification both to Lord Kintore (from whom the animal was very properly called the Kintore Ox) and to Mr. Combe. This gentleman, however, was bid 75*l.* for him; but as Lord Kintore had another beast at Keith Hall a year younger, and nearly as good, he determined to have him sent down to Scotland again, in order that he might exhibit them both at the next Highland Society Cattle show at Aberdeen. Lord Kintore is a great advocate for one cross of the Teeswater with the Aberdeen. This animal was a sufficient proof of what may be effected by it; but they rapidly degenerate if the cross is further pursued. The convenience of carriage, now afforded by the introduction of steam, will probably tempt many of the northern breeders to try this first cross.

In the attempt permanently to improve the Aberdeen cattle, all the southern counties of Scotland were occasionally resorted to, but with doubtful success, until at length the breeders directed their attention nearer home. The Fife, or Falkland breed, possessed enough of the old cattle to bid fair to mingle and be identified with the natives, while the bones were smaller, the limbs cleaner, and yet short; the carcass fairly round, and the hips wide, and they were superior in size, hardy, and docile, and excellent at work, and good milkers. These were desirable qualities, and particularly as mingling with the Highland breed. Accordingly bulls from Fife were introduced into Aberdeen, and the progeny so fully answered the expectation of the breeder as to be generally adopted, and to become the foundation or origin of what is now regarded as the Aberdeenshire native breed.

The horns do not taper so finely, nor stand so much upwards as in the West Highlanders, and they are also whiter; the hair is shorter and thinner; the ribs cannot be said to be flat, but the chest is deeper in proportion to the circumference; and the buttock and thighs are likewise thinner. The colour is usually black, but sometimes brindled: they are heavier in carcass; they give a larger quantity of milk; but they do not attain maturity so early as the West Highlanders, nor is their flesh quite so beautifully marbled: yet, at a proper age, they fatten as readily as the others, not only on good pasture, but on that which is somewhat inferior. Mr. James Rennie, of Fantassie, used to prefer them as fatteners to any of the Scotch cattle. Mr. Walker, of Wester Fintray, on the banks of the Don, has some very fine specimens of the pure Aberdeenshire breed. They are perfectly docile, and sufficiently hardy for any climate to which they are likely to be transplanted. They are now rarely used for husbandry work, or, if they are, it is only for one year. At four years old they are usually sent to grass for six months, after which they will weigh from 5 to 6 cwt. In the fertile districts of the low country, abounding with summer pasture and winter food, they usually reach at their full growth from fifty to seventy stones Dutch; and have been frequently known to feed from fifteen to sixteen hundred pounds. The breed has progressively improved, and that by judicious selections from this native stock. It has increased in size, and become nearly double its original weight, without losing its propensity to fatten, and without growing above its keep. The alteration and improvement in agriculture, and the introduction of turnip-husbandry, have contributed to effect this. Mr. Leith of Whitehaugh, and Mr. Camine of Auchery, very much contributed to the improvement of the Aberdeenshire cattle. The breed of the former gentleman was remarkable, not only for their increased size, and the perfection of some of their points, but for being more than usually well horned; the cows of Mr. Camine yielded from six to ten Scots pints of milk, instead of four pints, which were considered to be the average produce of a tolerable cow.



[*The Aberdeenshire Ox.*]

Beside these there is a breed of polled cattle, said by some to be different from the Galloways, and to have existed from time immemorial; others, however, with greater reason, consider them as the Galloways introduced about thirty years ago, and somewhat changed by change of climate and soil. They are of a larger size than the horned, although not so handsome. Of late they have been much improved by careful selection from the best of their own stock, and are becoming more numerous. In some districts they are equal to or are superseding the horned breed. They usually equal in weight the larger varieties of the horned breed, but the quality of their meat is said to be inferior. As they are in a measure occupying the situation of the larger horned cattle, these, in their turn, are intruding on the cattle of the hill country; there they rapidly diminish in size: hence we have the small Aberdeens of the hills, weighing from twenty to thirty stones, and contending with and gradually displacing the Highland breed.

The Buchan cattle constitute a useful variety of Aberdeenshire cattle with some peculiarities of form and properties. Mr. R. Gray thus describes them in the 'Quarterly Journal of Agriculture:'—'The cattle in Buchan are chiefly of the short horned kind,' (he means comparatively short, and he thus speaks of them in opposition to the long horns,) 'not very large, but short-legged and hardy. The best sort used to be polled*, and some of them, that do not begin to have the Ayrshire blood in them, are so still, and are of a dark or brown colour. The breed of cattle in Buchan is peculiar to that part of the country, and deservedly esteemed for its milking quality, and the beef it produces. From the great extent of grass lands in Buchan more cattle are produced in it than in most other districts. They are generally bought by dealers from the south when two, three, and four years old, and at the latter age they weigh from fifty to sixty stones. The cows of Buchan are not large; but, on account of the excellent quality of the pasture, they yield a considerable quantity of milk, from the cream of which butter is made to a great extent, and of excellent quality.'

Notwithstanding their small size, they will yield from three to four, and sometimes seven gallons of milk per day. They are fed principally with oat-straw in the winter, but they sometimes get plotted hay, or hay on which boiling water has been poured. It used to be the practice in the neighbourhood of Peterhead to give them green kale in April, which is sown in the preceding spring, transplanted in June or July, stands the winter better than turnips, and vegetates strongly in April. By adopting this plan, the dreadful interval for the farmer between the winter and summer feed was in a great measure filled up.

'In the course of the year there are nearly fifty markets held in this district for the sale of cattle, and the amount of the sales at Aiky fair may be estimated at upwards of 12,000*l.* annually.' If we reckon that one-fourth of the Buchan cattle are sold at this fair, we shall have 50,000*l.* as the annual value of the beasts that are drafted from this district; and, calculating this district at not quite a fourth of the superficial extent of the county, yet containing a considerable portion of the richer soil, we may fairly conclude that 150,000*l.* are brought into the county by the sale of black cattle alone.†

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* Mr. M'Pherson says, that 'a variety of the polled cattle is the principal breed in the Buchan district of Aberdeenshire.' The native, or Buchan cattle, were probably polled, and the horned ones are a mixed breed, between the natives and the Ayrshire: they are not so hardy as the common Aberdeenshire cattle, and do not fatten so speedily.

† The value of those slaughtered for home consumption should be added; and which are about 10,000, at 10*l.* per head, yielding 100,000*l.*; so that the total value of Aberdeenshire cattle annually sold or killed will be 250,000*l.* Dr. Keith, in his 'Survey of Aberdeenshire,' has given a very laboured account of the value of the cattle stock, and which may be interesting to the reader, since some of the principal markets for the sale of cattle are in this county, and it contains nearly double the number of beasts that are to be

A fourth variety consists of all the pure breeds from the north of England and the south of Scotland. The Holderness has been once more attempted to be introduced, but with no marked success. The Ayrshire cattle do well wherever they go if the soil is not too barren, or the climate too severe; but it must require a considerable alteration in the system of husbandry to make Aberdeen, generally a decidedly dairy county. In the estimation of the Aberdeenshire farmers, no breed answers so well as the native one of the district; and certainly no cattle will fetch so good a price among the drovers at Old Deer or Aiky fairs, or be so readily sold again to the English graziers, who fatten them for the Smithfield market. The present Duke of Gordon, to whom we are indebted for many facilities in acquiring a knowledge of the Aberdeen cattle, has been foremost in the attempt to improve the breed of this district. His bulls and cows from Galloway, Argyleshire, the Scottish islands, and Durham, were the best that could be procured, while his selections from the native breed were most judicious; and although the cattle retain much of their original character, they have been considerably improved, while a spirit of emulation has been excited which cannot fail to be useful.

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found in any other county except Perth. His calculation was made in 1810. He supposes that there are

28,000 cows at 7*l*. each value	£196,000
22,000 calves are reared at 2*l*.	44,000
20,000 year-olds at 3*l*. 15*s*.	75,000
19,000 two-year olds at 7*l*. 10*s*.	142,500
21,000 three-years and upwards, at 12*l*. 10*s*.	262,500
110,000 total number, and in value	£720,000
To this he adds from the records of Aberdeen, 3680 beasts slaughtered in the city:	
Of that number there are 300 at £30	£ 9000
" " 600 at 25	15,000
" " 800 at 20	16,000
" " 800 at 16	12,800
Of inferior cattle 800 at 12 10*s*.	10,000
Of cows 380 at 10	3,800
Calves 1621 worth at least	3,400
Total killed in Aberdeen 5301	Value £70,000
Killed in Peterhead, Tarriff, and other smaller towns, about the same number, but chiefly cows and other inferior cattle, and the value about 6*l*. each	30,000
Sold to dealers 12,000 at 12*l*. 10*s*.	150,000
Value of those which are killed or sold	250,000
Value of stock as above	720,000
Total value of Aberdeenshire Cattle	£970,000

or nearly five times the annual rent, and a fourth part of the whole annual produce and agricultural property of every kind.

A writer in the Farmer's Magazine (1807) gives a curious and interesting account of the prices of husbandry stock in this district in the year 1747. He obtained it from a venerable old farmer in the eighty-ninth year of his age. 'On the death of his father he was compelled to go to service, and the highest wages he ever obtained were 16*s*. 8*d*. in the half-year. In 1731 he agreed with a landed proprietor to cut a ditch through a piece of mossy ground, ten feet wide at top, six at bottom, and six feet deep, for two-thirds of a penny sterling per ell, and while thus employed he paid 13*d*. per week for his board. By persevering in a course of honest industry and frugality, he found his stock in 1747, increased to 50*l*. sterling, with which he purchased eight oxen, all under six years of age, three cows, three horses, four one-year old stots and queys, furnished his house, purchased ploughs, harrows, &c., paid the expense of his mariage, servants' wages, and other incidents, and at Lammas 1748, when he began to harvest his first crop, he was not due a penny to the world.'

Anderson says that Mr. Farquharson, of Invercauld, has a breed of Highland beasts once crossed with the Falkland or Fife (which, although tolerable cattle, are by no means valued for their milk,) yet the descendants of these afford a large quantity of milk in proportion to their size, and which is also of a very rich quality. One of these small cows will yield during the season four gallons and a half of milk in the day, the cream of which being separated and churned will afford 1 lb. 10 or 12 oz. weight of butter.

Many cattle are grazed in Aberdeen that are not bred there. The farmer begins to purchase them as soon as the grass springs up, and they are sold off as the year advances. Some, however, are continued until January, and are fed in the stalls on turnips and hay, and then driven to Aberdeen, and sold.

There is nothing peculiar in the rearing of the calf, or the system of fattening the grown beast. The general practice is to feed the calves with milk warm from the cow; but they are sometimes allowed to suck until they are weaned, and, in a few instances, they are reared partly on oil-cakes. Formerly, however, the calves were permitted to go at large through the fields during summer, and pick up the grass at the roots of the corn. The practice was occasioned by the want of proper food and enclosures, and the fear of the calves being injured by being confined with the large cattle in the fold; but it was attended by much damage to the corn from their lying upon it and trampling it down, while the calves acquired so restless a habit, that it was afterwards impossible to confine them, except by the strongest and almost impenetrable fences. The cattle are pastured in the fields in summer, and fed with straw and turnips in winter, and sometimes with steamed potatoes, and a portion of clover hay.*

Little butter or cheese is sent out of the country except in the district of Buchan, the rest is consumed by the farmers or the inhabitants of the towns. The Buchan cows have been stated to be good milkers; and those along the coast answer tolerably for the dairy.

Dr. Keith has formed a curious computation of the value of the milk, butter, and cheese yielded by them.

1000 best cows, in the neighbourhood of some town, and principally of Aberdeen, yield butter and cheese to the value of 20*l*. each, or	£20,000
2000 at 15*l*. each	30,000
5000 at 10*l*. each	50,000
10,000 farmers' cows at 8*l*. each	80,000
5000 of cottagers' or villagers' at 6*l*. each	30,000
5000 small Highland cows at 4*l*. each	20,000
28,000 as already stated, and value of their produce	£230,000†

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* Mr. Gordon, in his answers to certain queries circulated by the Board of Agriculture, relates a singular instance of fecundity and early maturity in the Aberdeen cattle:—'On the 25th of September, 1805, a calf of five months old, of the small Aberdeenshire breed, happening to be put into an enclosure among other cattle, admitted a male that was only one year old. In the month of June following, at the age of fourteen months, she brought forth a very fine calf, and in the summer of 1807, another equally good. The first calf, after working in the winter, spring and summer of 1809, was killed in January, 1810, and weighed 6 cwt 3 qrs. 16lb. The second was killed Dec. 16, 1810, aged three years, six months, and weighed exactly 7cwt.; and on December 30, 1807, the mother, after having brought up these calves, was killed at the age of two years and eight months, and weighed 4 cwt. 1 qr. the four quarters, sinking the offal.

† The Statistical Account, describing the parish of Udny, states that, in 1791, the cows in the neighbourhood of Aberdeen yielded from six to ten Scotch pints of milk (from three

The horse has nearly superseded the ox for husbandry labour. At a little more than half a century ago oxen were used almost exclusively for the plough. Ten or twelve were often yoked together; but they were not the cattle of Aberdeen—they came from the southern counties of Scotland.[*] By degrees, part of the cattle were reared in Aberdeenshire, and some of the improved breed and some of the Lothians were yoked together. Horses then began to occupy the place of the southern oxen, and the horse and the ox worked together; the nobler quadruped then gradually displaced the cattle from the road-work, and left only the rougher part of the ploughing to the ox, and, at length, has nearly driven him from the plough also.[†]

KINCARDINESHIRE, OR THE MEARNS.

THIS small county insinuates itself in the form of a wedge between Aberdeenshire and Forfar. It is only thirty-two miles in length, and twenty-four in width at its broadest part, and much diversified with hill and dale, and therefore, possessing, within a little extent, a very great difference of climate. In the neighbourhood of the Grampians, occasionally covered with snow even in the summer, the climate is cold; along the coast, and open to the easterly wind, it is likewise chilling; and it is only about the banks of the Dee that it is mild and genial. The character of the cattle varies with the climate. In the neighbourhood of the Grampians we have the West Highlanders; but about the Dee, and even on the coast, they are little inferior to those of Buchan. A great many cattle are bred in the Mearns, but this is quite as much a grazing as a breeding country; and although it sends a great many of its own beasts southward, a considerable number are bought at the fairs in Aberdeenshire, which are fed on what are termed the grass-parks, that are found in the neighbourhood of almost every gentleman's seat: these, however, are only *flying stock.*

The prevailing colour of the Mearns cattle is black; but some are dark-brown, or brindled. They have rather larger and more spreading horns than those of Aberdeenshire; they feed as kindly as the Buchans, and are not much inferior to them for the dairy.

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to five gallons) daily, and that one farmer kept fourteen cows, the milk of which, after the cream was taken, was sent to Aberdeen, and sold at 1*d.* and 1½*d.* the Scotch pint (2 quarts); while the butter from these cows was two stones per week, and usually sold at 8*d.* per lb. of 28 oz.

[*] The Rev. T. Shepherd, in his statistical account of Bourtie confirms this. Writing in 1793, he says, 'About twenty years ago our country did not breed cattle of sufficient bulk and strength to labour the ground. They were mostly brought from the south, particularly from Fifeshire. In a few years, by hard labour, they were worn out and became unfit for service, and, as the farmer had not the means of fattening them, he very often sold them for a third part of what they cost him. The case is now much altered for the better. The farmer brings up oxen able for his work; sells them or fattens them when they begin to be upon the decline; and in this way is rather a considerable gainer than a loser upon his work cattle.'

The Rev. A. Smith, in his account of Keig, in the same year, says that the majority of the farms are small, and the horses and cattle of two neighbouring tenants are often joined in one plough. He calculates the number of ploughs at 47, drawn by 88 *horses,* 87 *cows, aad* 153 *oxen and young cattle.*

The Rev. T. Birnie, in his account of Alford, in 1795, says, 'Every farmer is ambitious of having many pairs of oxen in his plough: some have six, and few common farmers have less than four. Smaller tenants yoke oxen, horses, and even bulls, cows, and young cattle, to make up what they deem a sufficient strength. Every farmer sells one or two pairs of oxen yearly, and replaces them by others of his own rearing.'

[†] Sir John Sinclair, in his 'Statistical Account of Scotland,' and speaking of the parishes of Keithhall and Kenhall, says that they contained '1038 cattle, whose value is

Mr. G. Robertson, in a very interesting work, entitled 'Rural Recollections,' and now quite out of print, says, that 'Previous to the year 1774, there had been little done in this county to improve the breed of cattle; but about that time there were sundry individuals who distinguished themselves by their attention to this branch of rural economy. Of these may be mentioned Sir Alexander Ramsay, of Balmain; Mr. Leith, of Whiterigs; his brother, Dr. Leith, at Johnston; and Mr. Fullarton of Thornton. These gentlemen were all at great pains to select the best-shaped of their own cattle for breeders; and, what was of as much importance, they took care to provide a full supply of green food for them in winter, by a more extensive cultivation of turnips. By this means they imparted animal vigour to their stock, while nature, thus aided, still further improved the shape.

'At the present time (1807) the Kincardine cattle are the best of the Scottish breed; and, unless it be from Buchan, I have nowhere in Scotland seen a more stately ox.*

A Mearns ox of a year old will weigh about 17 stones, Imperial weight; one of two years will average 28; one of three years old 40; and one of four years old 52; increasing in weight ten stones per year after the first year. Some, however, will grow to 90 stones; and Sir Alexander Ramsay killed one that was above 156 stones. A century ago the largest ox did not weigh more than 25 or 30 stones.'

In the statistical report, it appeared that the number of cattle was 24,825, or, at the rate of one beast for every three acres in cultivation. Of this number 6236 were milch cows, and 5280 calves under a year old.

Mr. Robertson calculates their comparative value, and also with respect to the land on which they are fed.

'5280	calves, each worth when reared, 2*l*.	£10,560
5016	year-olds, each worth 4*l*.†	20,064
5016	two-year olds, at 8*l*.	40,128
1672	three year olds, at 12*l*.	20,064
446	draught oxen, at 15*l*.	6690
6236	milch cows, at 8*l*.	40,888
1159	cattle bought in at 10*l*.	11.590
24,825	beasts, worth each on the average 6*l*. 8*s*.	£158,984

3733*l*.,' and that the number of cattle has very much decreased, owing to the disuse of oxen for the plough. In 1778 these parishes contained twenty-six ox-ploughs, with ten or twelve oxen to each, besides a greater number of smaller ploughs; but that in 1791 they had diminished to eight ploughs.'

* The Statistical Account of Scotland, describing the parish of Banchory Tornan, in this county, gives a satisfactory illustration of the rapid progress of improvement. In 1758 that parish contained only two carts, in 1791 it could boast of 120.

† By year-olds and two-year olds, is understood cattle that were of those ages in the preceding spring; the price is calculated on the supposition of the cattle selling at 8*s*. the stone weight, of 16 Amsterdam pounds, sinking the offal; and the Amsterdam pound, which used to be the standard weight of that part of Scotland, containing 17½ oz. This calculation supposes the cattle to sell at 3*s*. 8*d*. the Smithfield stone of 8lbs.

We make another extract from this work, which is not now to be purchased, and will not be reprinted. He is speaking of the variation in the price of cattle. 'The price of cattle varies here from year to year, like every thing else, but on the whole, has greatly advanced during the last fifty years. About the year 1740, the largest ox in the county, weighing from 25 to 30 stones (Dutch weight 43 to 51 stones Imperial weight), could have been bought for 20*s*., or, at most, for 21*s*. They rose gradually in value till about the year 1764, when cattle of that size, and as full fed as the country could make them, brought from 3*l*. to 4*l*., or from 2*s*. to 2*s*. 8*d*. the stone. From this period, cattle, being somewhat better fed, not only became larger in size, but were improved in condition: and, from the increased demand for butcher-meat, combined with the gradual decline in the value

This is at the rate of 2*l.* 3*s.* 9*d.* on each acre, or 33½ beasts on every 100 acres; but when the quantity of cultivated pasture alone is reckoned, it amounts to rather more than one beast per acre. This, however, varies much in the different districts.'

He also calculates to keep of these cattle: 'the calves at 2*l.* each per annum; the year-olds at 2*l.* 10*s.*; the two-years at 3*l.*; the three years at 3*l.* 10*s.*; the milch cows at 5*l.*' He also takes into account the average number of sheep and horses on the farm, and the value, expense, and profit of each, and all the casualities of every kind; and, on the whole, he proves that 'the farmer does not derive more than ten per cent. on his capital, and which will afford him but a scanty subsistence for his family, and little or nothing to add to his capital.'

About one-half of the butter and cheese is usually consumed in the farmer's own family or among his labourers, and the rest is sent to the Aberdeen, or Montrose, or Leith markets. The butter is usually excellent, but the cheese of an inferior quality.*

of money, by the year 1792, brought up the price of half-fed cattle to the rate of 6*s.* 8*d.* the stone (16 lbs.) Since that time the price has risen and fallen alternately; in some years it has been as high as 10*s.* a stone, and in the others as low as 5*s.* or 6*s.*

'One remarkable circumstance in the price of cattle is, that they are generally dear or cheap in the inverse ratio of the means of keeping them. Thus, in a year of plenty, conjoining a weighty crop of turnips with a luxuriant voggage, the price of cattle gets up; or the farmers, not only can afford to retain their cattle, but are compelled to do so, in order to consume their crop. In a year of scarcity, again, particularly of winter food, the price of cattle declines even to the lowest pitch, the farmers being forced to part with them at any price they can get. In the great penury of fodder in 1807, some cattle were sold as low as at the rate of 1*s.* a stone.'—p. 440.

The account of the introduction of *turnips* in Kincardineshire must not be omitted. '*Turnips* were first seen in this county about the year 1754, being introduced by Robert Scott, Esq., Dunninauld, on the farm of the Miltown, in the parish of St. Cyrus, which he then held in lease; but he had few to follow his example for many years. In 1764, William Lyall, a farmer in Wattieston, in the parish of Fordoun, ventured to sow half an acre in turnips, which at the time, was the greatest extent of them in any farmer's hand, and they were disposed of chiefly in small parcels to his neighbours as kitchen vegetables, at a penny the stone. It was not till about the year 1775 that they began to be generally cultivated. They are now universal over the whole county, insomuch that about one-seventh part of the whole land in tillage is in turnips.

'They are cultivated uniformly in drills; and this crop now forms the very basis of good cultivation in the Mearns, whether with respect to the succeeding crops, or to the feeding of cattle to which it is applied, but more for the rearing than for the fully fattening of them, as the thin population of the county does not require a tenth part of the fat cattle they could produce.'—p. 460.

* Of the keep of the 'cotter's' milch cow, and of the situation of the 'cotter' himself, in this part of Scotland (in 1807), Mr. Robertson gives an interesting description. He had been speaking of the cottages of the mechanics and little tradespeople, which are built of stone and turf, or sometimes stone and lime, and consisting of two apartments, divided by the furniture, the walls seldom more than six feet in height, and the roofing composed of thin turfs, overlaid with a thinner coating of straw, tied down with straw ropes, like a hay-stack; every one with its little garden or kale-yard; and many of them displaying no little taste in its cultivation, and growing the different kinds of coleworts, of which a dark-red kind is most prevalent, and forms the basis of '*old Scotia's kale-brose*;' and besides this, some leeks and cresses, and bushes of gooseberries and currants, and flowering shrubs, as roses and honeysuckles—and fine smelling herbs as thyme and lavender, and southern wood, and tansy 'to kill the worms,' and a sprinkling, too, of perennial flowers, as polyanthus and cowslips, and yellow lilies: and, in some cases, an apple-tree trained upon the sunny side of the house wall, and house-leeks on the *riggin*. He goes on next to speak of the cottages of the farm servants.

'The cottages attached to the different farms are more regularly disposed, being generally set down by the way-sides, in the neighbourhood, but not in the immediate vicinity of the farm-stead. They are beginning to be constructed in a similar style, built of stone and lime, and of an increased height in the walls; but the roof is still generally of thatch, or in some cases of gray slate, and in a few instances of tile which is the worst roofing of any. The internal accommodation is simply, as it was wont, with two apartments divided by the furniture, but having now a grate in the fire-place, and a glass win-

FORFARSHIRE OR ANGUS.

This county derives its first name from its principal and central town; the second oftenest occurs in ancient records, and was probably the original name. The eastern part of it stretches along the coast from Kincardineshire to Fife, and the soil and climate resemble those of the coast districts of Kincardine, Aberdeen, and Banff, while the interior (nearly half of the county) is occupied by the Grampian Hills. The cattle (said in the statistical account to be 45,400*) may be divided into the horned and the polled. The former, and of the West Highland breed, used to prevail in the interior, and are still found, but of a diminutive size, and rarely exceeding twenty or twenty-five stones. Towards the coast, they resemble more those of Kincardine and Aberdeen; but there are some points of difference. The prevailing colour is black, but with more admixture of other tints: some

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dow in the wall. These cottages have all a piece of garden ground for raising potherbs; also a bit of potato land, along with the master's own field; a patch of flax sown; and what is best of all, a milch cow, that feeds in the fields along with the master's own cattle, and is otherwise not the worst fed of the whole herd. These good things, with a weekly allowance of two pecks of oatmeal, and an adequate money-fee, which has improved from 3*l.* to 12*l.* or more in the year, makes this class of peasantry the most comfortably provided for of any. They may not get rich, indeed, but they never feel want.'—*Rural Recollections*, p. 417.

* If this calculation of the number of cattle in Forfarshire be considered as giving the average number tolerably correctly, and we estimate them at 7*l.* per head, the value of this division of live stock will be 317,800*l.*

The Rev. C. Peebles, in his statistical account of Mains, in Angus, asserts that oxen were not used for husbandry work in Angus in 1790. He draws a very curious comparison between the farmers and their mode of management in 1760, when he first began to observe them, and 1790, when he wrote. The following are only a few of the points on which he touches:—

1760.	1790.
Land ploughed with oxen. Only a few horses kept to draw the harrow in seed-time, and bring in the common harvest. 7*l.* thought a great price for a horse.	Oxen not employed in agriculture. Farmers have their saddle-horses, worth from 24*l.* to 30*l.*, and work-horses from 20*l.* to 25*l.* each.
Land rented at 6*s.* per acre, and only two small farms enclosed.	Land at 30*s.* and all enclosed with dykes and thorn hedges.
No English cloth worn but by the minister and a quaker.	There are few who do not wear English cloth, and several the best superfine.
Men's stockings were what were called plaiding hose, made of woollen cloth. The women wore coarse plaids. Not a cloak nor a bonnet was worn by any woman in the whole parish.	Cotton and thread stockings are worn by both sexes, masters and servants. Some have silk ones. The women who wear plaids have them fine and faced with silk. Silk plaids, cloaks, and bonnets are very numerous.
Only two hats in the parish. The men wore cloth bonnets.	Few bonnets are worn, and the bonnet-makers' trade is given up.
There was only one eight-day clock in the parish, six watches, and one tea-kettle.	Thirty clocks, one hundred watches, and above sixty tea-kettles.
The people never visited each other but at Christmas. The entertainment was broth and beef, and the visiters sent to some ale-house for five or six pints of ale, and were merry over it without any ceremony.	People visit each other often. Six or seven dishes are set on the table differently dressed. After dinner a large bowl of rum punch or whiskey toddy is drunk—then tea, then another bowl, then supper, and, after that, the grace drink.
Every person in the parish, if in health, attended divine worship on Sunday, which was regularly and religiously observed.	Much lukewarmness prevails with regard to religious instruction, and a consequent inattention and indifference to woriship and ordinances.
Few were guilty of any breach of the third commandment.	The third commandment seems to be almost forgotten, and profane swearing greatly abounds.

have white spots on the forehead, and white on the flanks and belly. There are more brindled cattle than in Aberdeen; some are dark red, and others of a silver yellow or dun. A few are black with white hairs intermixed; and occasionally a beast is seen that is altogether white, with the exception of a few black hairs about the head.

The Forfar horned cattle are shorter in the leg, thicker in the shoulder, rounder in the carcase, straighter in the back, and carry the head better than the Aberdeens. The horns are smaller, better proportioned, curved upwards and forwards, and sharper at the points. They are evidently a cross between the Highland and the Low Country or doddied breed.

A writer in the 'Farmer's Magazine' for 1814, replying to some queries respecting the breed of Angus, draws the following comparison between the horned cattle of this county and those of the neighbouring districts.

'The horns of Angus and Kincardineshire cattle are much the same, being smaller and better proportioned than those of the Buchan district of Aberdeenshire, and more like those of the middle district. At three years old the horns of an Angusshire stot will be as well raised and sharp at the extremity as at two years old, but not so strong in the horn. The horns of the cattle in the higher districts of Aberdeenshire are by far thicker, rounder, and straighter out from the sides of the head, than those of the cattle in the middle districts of Angus, while the Fifeshire cattle have horns larger, more oval, and not so sharp at the point, as the generality of the Angus cattle.

'The Kincardineshire cattle are rather smaller that the Angus, but the shapes are much the same. Those of Fifeshire are stronger, larger, and rougher-boned than the Angus cattle.

'The weight of the Angus horned cattle cannot be well ascertained, as few are kept in the county to the proper age, and the difference in keeping of these is so great; but being so well proportioned, they will weigh more to their appearance than the cattle of either of the above counties. The Angus cattle are preferable for feeding, having all the good qualities for that purpose.'

An account of the Angus polled or *doddied* cattle, and which is now become the most numerous and valuable breed of that county, will be given hereafter when we treat of the polled cattle generally.

FIFESHIRE.

The county of Fife is a kind of peninsula included between the river Tay on the north, and the Frith of Forth on the south, with Perth, Kinross, and Clackmannan on the east. The climate along the Frith of Forth is temperate; it is also mild along the banks of the Eden; but the west and north-west parts, in the neighbourhood of the Lomond hills, are chilly and ungenial. In no county, however, is the character of the cattle so uniform, and in few parts do they more decidedly unite the best qualities which cattle can possess. They bear evident impress of their Highland origin, but there has been a cross which distinguishes them from all other Scotch cattle. Dr. Thompson,* in his not altogether scientific or satisfac-

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*The statistical account of Scotland, under the article Dunichen, gives us no favourable opinion of the Scottish cow-leeches, when he describes the manner in which they were there, and probably in the greater part of Scotland installed in their office. 'Formerly one blacksmith, who was also a farrier, was alone allowed to exercise his business on a barony or estate. He had the exclusive privilege of doing all the blacksmith and farrier's work. For this he paid a small rent to the proprietor, and every tenant paid him a certain quantity of corn. About thirty years ago a person of this description had this sole right on the barony of Dunichen, for which he paid 1*l.* per annum yearly.

tory 'Survey of Fifeshire,' thus describes them :—'Though the true Fife breed may be found of any colour, the prevailing one is black; nor are they less esteemed though spotted or streaked with white or of a gray colour. The horns are small, white, generally pretty erect, or at least turned up at the points, and bending rather forward.' (The Fife ox would be readily distinguished at a considerable distance by this peculiarity in the form of the horn.) 'The bone is small in proportion to the carcase; the limbs clean, but short; and the skin soft: they are wide between the extreme points of the hock bones; the ribs are narrow and wide set, and have a greater curvature than in other kinds, which gives the body a thick, round form.' (The thick, round form of the Fife cattle is evident enough; but we confess we do not understand this account of the peculiarities of shape which are to give it.) 'They fatten quickly, and fill up well, at all the choice points. They are hardy, fleet, and travel well; tame and docile, and excellent for work, whether in the plough or in the cart.' The use of oxen in husbandry, however, is much diminished even in Fife. In 1792, in Auchterderran, of the fifty-one ploughs which the parish contained, seventeen were worked by horses, and now a smaller number would be found worked with oxen. There is a very great difference in the size of the Fife oxen, and this is to be attributed to the difference in the quality of the pasture, and the attention paid in breeding and rearing. When fed for the butcher, they generally weigh from thirty-five to sixty-five stones. They have been slaughtered at more than 100 stones.

They are far from unprofitable for the dairy. A good Fife cow will give from five to seven gallons of milk per day, or from seven to nine pounds of butter, or from ten to twelve pounds of cheese per week for some months after calving; while the cow is in milk for ten or eleven months.

Writers have amused themselves with many unsatisfactory disquisitions as to the origin of the Fife breed. The Highland origin cannot be disputed; but a southern cow or bull was certainly one of the progenitors of this very useful variety of black cattle. Some say that when James VI. (James I. of England) received the news of the death of Elizabeth, and was compelled to set out on his journey to England without the time or the means to make his triumphal procession sufficiently splendid, he hastily borrowed a considerable sum of money from some of his faithful adherents in Fife. The English treasury, however, was not sufficiently rich, or his private resources not such as to enable him to repay the debt in specie; but as an honourable acknowledgment of the obligation, and one of the greatest benefits he could confer on his former subjects, he sent them some valuable cattle from England. From what county they came, or to what breed they belonged, neither history nor tradition relates.

A more generally received opinion is, that in addition to the 30,000 angel-nobles, which Margeret, the daughter of Henry VII. of England, brought with her when she became the bride of James IV. of Scotland, 300 English cows, a simple but invaluable wedding present, were added by her father to the dowry. The progeny of these cattle received the name of *Falklands*, because James and his young consort resided principally at Falkland palace, and to the park belonging to which this present from her father was naturally conveyed. Here again tradition is silent as to the district whence these came. Cambridge claims the honour, but probably without pretensions better founded than those of many other counties. There is no doubt, however, that at a considerable remote period, the Fife breed was materially improved by intermixture with some southern variety, and that the improvement commenced in the neighbourhood of Falkland.

Similar attempts have since been made in other parts of Scotland, but rarely with such decided success; this, however, will not surprise the agriculturist when it is recollected, that while the Highland cattle of Scotland have remained, until very lately, nearly the same that they were centuries ago, the English cattle generally have strangely altered their character, and doubled their size, since the time of Henry VII., and even that of James I. The comparatively small cattle of England might then amalgamate with the Scotch, but there would be less affinity between the Scotch and those of the present day.*

However the fact may be explained, Fifeshire now contains, as decidedly as Devonshire, or Herefordshire, or Sussex, a breed—and an excellent one, too—of her own. Made wise, and somewhat expensively so by experience, the Fifeshire farmers are convinced that their cattle cannot be further improved in all their points, or *as a whole*, by any foreign cross, and they confine themselves to a judicious selection from their own.† The Fifes, however, have never established themselves in the south, nor penetrated towards the north beyond the counties immediately continguous. The prejudice of each district in favour of its native breed may partly account for this, but a more satisfactory explanation results from the fact, not sufficiently regarded by agriculturists, and to which we shall often refer, that there must be every where a kind of identity between the breed and the soil, and which is always slowly, and in many cases, never acquired.

There is no great peculiarity in the management of the Fifeshire cattle. In some parts the dairy is particularly attended to, and from the account which we have given of the quantity of milk and butter yielded by a Fifeshire cow, it returns a fair average profit.

On farms adapted to breeding, the dairy is a secondary object. A sufficient number of cows are kept to rear the calves, some of which are bought of the cottagers, or at the neighbouring markets. They are fed from the pail, and usually obtain every day 2½, or three gallons of milk, or hay-tea, or gruel, mixed with the milk, for ten or twelve weeks, when they are weaned. The late calves are generally disposed of as soon as possible, and the milk converted to the purposes of the dairy. The number of milch cows are calculated at about 10,000. Dr. Thompson supposes that the whole stock of cattle, including lean ones, and others brought from the neighbouring counties, for grazing, is about 60,000; and the statistical account gives the same number.*

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* They have, however, in some cases, advantageously amalgamated. Mr. Adam Ferguson, in his Essay on Crossing, (Quarterly Journal of Agriculture, No. I,) after observing that 'nothing can wear a more inviting aspect than the idea of uniting the early fattening propensity, docile habits, and large size of the one breed with the hardiness and many valuable qualities of the other, securing, as is thus imagined, a permanent variety exceeding in value either of the parent stocks,' and acknowledging that 'the first fruits will, in general, tend to confirm this hope,' yet 'cautions the breeder against over-sanguine hope from such a system.' He relates, however, some instances in which the experiment did succeed to a very great extent. His account is as follows:—

'About the same time I had an excellent opportunity of observing, during three years, an interesting experiment, conducted upon an extensive scale by a gentleman of much talent and zeal as an agriculturist. His object was to obtain a mixed breed which should permanently retain all the good points of improved short-horns, and choice West Highlanders or Kyloes. He bred from the short-horn bull and Highland cow, and had continued to do so through many gradations for ten or twelve years to the period when I last inspected his stock. At this time my impression was, that the variety was fast returning to the pure short-horn. Many fine animals were brought to market.

† The Rev. John Forrester, however, asserts, in his 'statistical account' of the parish of Anstruther Wester, in this county, that the breed of cattle has been much improved by crossing with the Lanark and the Holderness, and by winter-feeding on turnips. The first result is, as we have asserted in the text, contrary to the experience of every agriculturist: but of the truth of the latter assertion there can be no doubt, for there are few more profitable applications of turnips in a breeding country than to the support of the young stock.

Some, however, of the Fifeshire farmers, have suspected that their cattle, although excellent, might be capable of improvement, and they have crossed them with the Angus, the Ayrshire, and the Teeswater. A breed of polled cattle has also made its appearance in Fife, possessing all the good qualities of the horned, with even superior propensity to fatten, and much greater quietness and docility. The pure Durhams have been established in some parts of Fife, but not always without difficulty. Those that were imported have been injured by, or sunk under the greatest rigour of the climate; but many of the calves of the Durham breed, dropped in Fifeshire, have, on good pasture, retained all the good qualities of the short horns, combined with the requisite degree of hardihood. Lady Mary Lindsay Crawfurd, of Crawfurd Priory, was unsuccessful at first in her attempts to keep the Durham breed, but she has now many pure and beautiful cattle of this kind.

THE CENTRAL DISTRICT.

This consists of Perthshire, Stirlingshire, Clackmannan and Kinross, and will not long detain us, as there is little distinctness of breed, and few peculiarities of management.

PERTHSHIRE.

It would be difficult to point out any native breed of cattle in Perthshire. If it can be found in any district it is in the moorland part of the county, where the attention of the farmer used to be chiefly directed to the rearing of cattle, for his ground was good for nothing else until the sheep husbandry was introduced.† If we consider these as the true Perthshire cattle, they are of an inferior kind. The highland origin is visible about

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* The following account of the dimensions of a celebrated bull belonging to the Earl of Devon may give agriculturists of other districts a more satisfactory notion of the proportions of the best Fife cattle:—

	Feet.	Inches.
Length of the head	2	0
Do. from the root of the horn to the rump . .	8	4
Do. from the root of the horn to the top of the shoulder .	2	6½
Do. of the horn	1	0½
Distance from point to point of ditto . . .	1	10
Girth of the body at the shoulder . . .	7	6½
Do. do before hough bones . . .	7	8½
Girth of the body fore leg smallest part between the knee and hoof	0	9¾
Do. do. hinder leg at ditto . . .	0	9½
Do. do. fore leg at fore spald . . .	2	0
Height at the shoulder	4	11
Do. at hough bone	4	11
Do. from the shoulder to the breast bone . .	3	6
Do. of the knee-joint—fore leg . . .	1	0½
Breadth of the hough bones	2	2

† Dr. Robertson, in his 'Survey of Perthshire,' gives an eloquent and unanswerable defence of the system of sheep-husbandry introduced here, as well as in almost every part of Scotland, and materially diminishing the breed of cattle. We ought by no means to forget the improvement occasioned by the sheep. They enrich the quality, and enlarge the quantity of grass within their walk more than any other species of animals. They never deteriorate the soil; they render it more and more productive; and wherever their numbers are increased upon a certain extent of land, they help to support that increase of numbers by producing an increase of food. The ground is not only made green, and the heath extirpated by the enriching quality of their manure, but the finest grass springs up spontaneously where it had formerly been scanty and coarse; and when this powerful top-dressing of our whole hills with sheep-dung and urine has been

them, but it has been deteriorated by some southern mixture; or, at least, the two breeds have not mingled well together—for the beauty of form, and propensity to fatten of the Argyle are diminished, and the milking properties of the southrons are not fully developed.

In many parts of Perthshire the breeds of the neighbouring counties are found unmixed. In the vicinity of Perth and the Bridge of Eam, and in the Carse of Gowrie, the Fifeshire, and Argus cattle are found, either pure or mingled in various proportions. About Monteath many Galloways are grazed. In other parts of the south, and on the borders of Stirling and Dumbarton, the Ayrshire cows prevail, or have superseded all the rest; and on the borders of Argyle the true West-Highlanders are seen, and degenerated in none of their essential points. A few gentlemen have attempted to introduce the Devons, others the Guernseys, some the short-horns, and even the long-horns have found their advocates. Perthshire, like many of the midland counties of England, presents a mixture of every breed, varying according to the soil, or the description of the farm, or the whim of the occupier.

Another system of grazing is pursued in some parts of the county, and particularly in the grazing districts. Highland stots are bought in at the end of autumn, and fed during the winter, for the May and June markets. They are turned out on the *foggage*, or pastures that have been mown, until the middle or end of December, according to the severity or mildness of the season. Then a little straw with bog-hay is carried to them, and in the May or June of the following year, they pursue their course southward, yielding to the farmer a profit of 30*s.* or 2*l.* per head.

In respect to the number of cattle which the county contains it stands second; the statistical account assigns to it more than 79,000. The cattle have, however, of late materially improved although they have not assumed any distinguishing character; and the dairy cattle, in the midland parts of the counties, have taken somewhat the start in the career of improvement. A few oxen are worked in the plough, but none on the road.

Sheep husbandry has advanced as rapidly in this country as in the neighbouring ones, and the bleak mountains of Perth are nearly abandoned to the sheep: on the other hand, the management of cattle, both in the grazing or dairy districts, is materially improved. In the Carse of Gowrie, where there is much arable land, the usual stock of the farm is not always sufficient to consume the straw. Young cattle are therefore bought in from the neighbouring markets, which are kept in the winter on straw and turnips, and in the following May are sold to the dealers,

completed, there is little doubt that the Grampians will be as verdant as the Ochils; while the Ochils had once as forbidding an aspect as the Grampians.'

We may compare with this, an account given of the management of cattle on the moorlands twenty-five years ago ('Farmer's Magazine,' 1807.) Formerly the cattle stock in this quarter were very much neglected during winter, no provision of succulent food, nor indeed of any thing excepting straw, being made for them. In the spring this was particularly hard upon the cows in calf. They were sometimes so debilitated as to be unable to bring forth; and frequently contracted diseases under which they laboured for a long time, and of which they never recovered. I well remember the poor wives during the nipping north-east winds in May, provincially called the *Cowquake*, tending their cows, reduced to a skeleton and covered with a blanket, while they picked up any spring grass which had begun to rise in the kail-yard, or at the bottoms of walls or banks; and to such extremities were they reduced at times, that I have heard of their taking the half-rotten thatch from the roofs of the houses, and giving it to the half-dead animal, as the means of prolonging their miserable existence. On this account the half of them did not take the bull, and those that did were too late for rearing stout calves. The yeld cattle were so emaciated, that it was always the end of the season before the heath, and sterile, hidebound leas on which they were depastured, brought them into such condition as would now be considered as but half-fat.

or the farmers of the adjacent counties, who give them a few months' summer pasturage, and dispose of them for England, or the southern districts of Scotland. In the Carse of Gowrie is found some of the most fertile soil, and also some of the most intelligent farmers in the kingdom; but in the Highland districts, even the sheep-husbandry needs much improvement, and the cattle are much neglected.*

Mr. Gorrie, in his 'Account of the Carse of Gowrie,' published in the Quarterly Journal of Agriculture for June 1832, says, 'Although the nature of the district renders the rearing of cattle less profitable than the production of grain, some specimens of the most improved breeds have been produced, which would have done credit to the most eminent breeders of the south. On the Braes (a level tract) of the Carse, breeding and rearing of cattle might be conducted more advantageously and to a greater extent than at present, were the higher part of the ground inclosed and properly sheltered by slips of planting.

STIRLINGSHIRE.

This is far more a grazing than a breeding county: indeed, the attention of the farmers is confined to grazing, to the exclusion of almost everything else, the very plough being chiefly used with a view to the sustenance of their cattle during the winter. The pastures of Stirlingshire, both natural and artificial, are exceedingly rich; and from its situation it forms the first convenient halting place for the Western Highland cattle, while it is the great thoroughfare for these cattle during the whole of the summer. Many of the Stirlingshire farmers purchase the best of the Skye or Argyle beasts about the beginning of summer, and turn them on their fine natural or artificial pastures, on which they are made ready for the market by the end of autumn.

The *carses* extending from Stirling to Boness can boast a soil, perhaps, not exceeded by any in Britain, and they are almost entirely under tillage; and to the West of Falkirk, large tracts of land are farmed out for grazing, either to residents in the neighbourhood or to speculators, and many of the butchers from a considerable distance. The summer feeding never fails, and, except in a year of extreme scarcity, the winter feeding for the large stocks of sheep and cattle bought in at the trysts is excellent.

In the statistical account of Fintry, in this county, honourable mention is made of Mr. David Dun, who established, if he did not introduce, this improved mode of grazing, and which has been adopted in a considerable portion of the west and south of Scotland. His principles were, to select from the choicest cattle in order to stock his farm, and to keep his grass lighter than farmers had been accustomed to do, *i. e.* to put fewer cattle upon his land than had been usual; and the consequence was, that his beasts throve with a rapidity before unexampled. He is said to have sold one Highland stot, which yielded fifty-two stones (tron) of beef.* At another time he disposed of twenty-five Highland stots for 12*l.* each, the lightest of which weighed thirty stones (tron). He died in 1794. He was leading a sheep across a wooden bridge, when the rail of the bridge giving way, he was thrown into the river, and, falling upon a stone, he was killed on the spot. He was with great propriety, called the Scotch Bakewell; and there was no man to whom the central districts of Scotland were more indebted.

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* In the statistical account of Longforgan, in the county of Perth, a singular account is given of the manner of fattening calves. 'They are fed in a box, which is made of very coarse boards, 4½ or 5 feet long, and 4 or 4½ high, and about 2 feet wide, in proportion to the breed to be fed. The boards of which the box is made are to be put so close to one another, as to let in sufficient air, but no more, as the exclusion of light is one essential part of the process. It stands upon four feet, and is placed a little slanting to drain off all wetness, and the bottom should be covered with straw or hay, and which should be changed twice a week. The calf is put into his box when newly dropped, or as soon afterwards as possible, and for the first week milk is given to it cautiously, after which the milk is given more freely, and when about ten days old it is bled. It then gets as much sweet milk fresh from the cow as it can take three times a day, and a large piece of chalk is hung in the box, which it occasionally licks. The bleeding is repeated once a week, and it becomes fine veal in ten weeks. If it is a bull calf, it is cut at about a week old, otherwise the veal will neither be so good, nor so white.

The breeding of cattle is mostly confined to the dairy districts, such as Kilsyth, Campsie,† Strathblane, St. Ninians, and the muir lands to the south of Falkirk; and here it is pursued with greater ardour than formerly, although seldom to much greater extent than to keep up the stock; but this stock is, since the introduction of Agricultural Societies and the offering of premiums, very materially improved.

The dairy cattle have been, since the year 1817, chiefly of the Ayrshire breed, and that mostly pure, for a cross between the Ayrshire and the native cattle has not generally succeeded. On the ground of some cottager, however, a cow of the mixed breed will occasionally be found yielding abundance of milk and tolerably good in quality, and afterwards fattening with a rapidity scarcely inferior to the true Highlander. The cattle that are designed for summer fattening are out day and night; but the milch cows are sometimes housed during the night, while by other farmers they are housed and fed by soiling during the heat of the day, and turned out at night.

Oxen were formerly much used in Stirlingshire; but, very few teams are now kept in any part of the country. The average number of cattle in Stirlingshire, including the flying stock, is rather more than 19,000.

The central situation of Stirlingshire with regard to the breeders of cattle in the northern and western counties, and the buyers or dealers from the southern and eastern parts of Great Britain, cause it to be selected for the holding of the principal fairs or cattle-markets of Scotland. The Falkirk *trysts* are the most frequented; they are held on the second Tuesday in August, September, and October. All the cattle from every part of Scotland, south as well as north, which are intended for sale, whether in good store condition, or almost ready for the butcher, or lean, and intended for wintering in richer pasture in the south, are driven to Falkirk.*

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* The weight is commonly calculated in these districts by the stone, *tron*, which consists of 16 lbs., at 22 oz. each, and, consequently, the weight of the beast was equivalent to nearly 82 stones of Imperial weight, or 14 lbs. each, or exactly 143 stones Smithfield weight of 8 lbs. each.

† The Rev. Mr. Lapslie, in his statistical account of Campsie, gives the following account of the cattle in that parish in 1793:—'Milk cows 749, which, within the last thirty years have increased considerably in bulk, hence they have a tendency to be in flesh more than to give milk; they, however, give on the average from seven to eleven Scots pints daily. Below seven they are not thought worth keeping for the dairy; above eleven they are considerd remarkable. From eight Scots pints nearly one pound of butter is produced, and the cheese is equal to that of Dunlop. Besides these there are cows and queys, 503; fat cows, and young beasts for the Falkirk market and the butcher, 917; and winterers, which are mostly grazed next summer for the butcher, 345. The winterers graze in the open fields during the whole winter season, and are fed once or twice a day with coarse hay, gathered in autumn among the cows' feet in their pastures. The graziers commonly begin to fodder, as they term it, about Christmas, (it is considered to be a severe winter when they are forced to begin before Christmas,) and continue till the beginning of April, when the cattle refuse it. There are few cattle grazed but Highlanders, and those from Argyleshire are preferred. North country cattle are rejected, being considered by the graziers sour, and difficult to feed.'

Mr. Lapslie gives a calculation of the consumption of animal food in this parish. 'In 1714, only three cows were killed for winter-beef in the whole parish, the gentry excepted. In 1744, the better farmers joined, and got a cow for a winter-mart, the price then being only 35*s.* or 40*s.* for a fat cow. In 1759, very decent farmers thought it necessary to have some part of a fat cow, or a few sheep, salted up for winter store; and in 1794, three hundred fat cows were killed annually about Martinmas time, for winter provision, beside the mutton, beef, and lamb, killed through the season; and few of the tradesmen sit down to dinner without fresh meat on the table, and malt liquor to drink.'

KINROSS-SHIRE AND CLACKMANNANSHIRE.

There is little difference in the character and general treatment of cattle in these diminutive counties; they approach to the Perthshire or Fifeshire breeds, in proportion as they border on either district. A great number of cattle used to be fattened in the distilleries of Clackmannan, and particularly in that of Kilbogie; seven thousand have sometimes been fed at this distillery in one year. The ordinary stock of Kinross is 5400, and that of Clackmannan nearly 1400, exclusive of those in the distillery. The cattle husbandry of Kinross has been materially improved within the last fifty years. The soil of Clackmannan is more fertile, and the few cattle of a superior description.

THE SOUTH-WEST LOWLANDS.

This district consists of Dumbartonshire, Renfrewshire, Ayrshire, and Lanarkshire. It is a manufacturing district, and very thickly peopled. Although occupying only one-thirteenth part of the extent of Scotland, it contains full one-fourth of the inhabitants; many cattle are, therefore, wanted for the butcher and the dairy. The soil and the climate are admirably adapted to the rearing and fattening of live-stock, and a more valuable breed, and particularly of dairy cows, is not to be found in the whole kingdom.

* The tryst used to be held on a large common in the immediate vicinity of Falkirk, but which is now enclosed, and a field in the neighbourhood of Stenhousmuir has since been selected. It is about three miles from Falkirk, on the other side of the Carron and the Glasgow canal, and is the property of Sir Michael Bruce. The road from Falkirk to it is not uninteresting; it is close to the celebrated Carron foundry, and that being past, the sheet of water above the works, and the woody winding way between it and the village, are very pleasing, while the traveller is but a little way from two spots connected with early and later Scottish history—the peace concluded between the Romans and the Scots, and the concealment and escape of the hero Wallace.

The field, or the toll at its entrance, is let to a *taxman* at 120*l.* yearly, and he demands 8*d.* for every score of black cattle, 3*d.* for every score of sheep, and 1*d.* for every horse. There are, beside, several tents erected on the field at which refreshments may be procured, or where business is transacted, and money paid and received; for the use of each of these the taxman receives 13*s.*

At the last October tryst (1832) there were, on the lowest computation, more than 50,000 black cattle, 30,000 sheep, and 3000 horses. It is worth going many a mile to witness such a collection of beasts, and including every variety of every breed of Scotland. It is a school for the agriculturist, from which he will not fail to derive the most useful lessons; and then, in the latter part of the day, when the tryst is over, to see every spot, not only of the flat muir, but of the beautifully undulating ground above, covered with cattle and sheep, and the herdsmen in their characteristic Scottish dresses, either stretched on their plaids and resting for a while their wearied limbs—but still watchful; or gathering into groups and relating the occurrences and bargains of the day; this is a scene which the agriculturist will not soon forget, and to which no one can be insensible.

The October is the largest tryst, for all the cattle which the farmer wishes to dispose of before the winter are then brought forward. In the three trysts there cannot be less than 80,000 cattle, 50,000 sheep, and 5000 horses, and, averaging the price of the cattle at 7*l.* each, and of the sheep at 18*s.*, and of the horses at 10*l.*, their gross value is nearly 650,000*l.*

DUMBARTONSHIRE.

In a great part of Dumbartonshire the introduction of sheep-husbandry has materially lessened the number of cattle: of this the author of the statistical account of Anoquhar gives a convincing proof, when he says that in the whole of that parish there were (in 1791) only 480 black cattle, although 10,000 sheep were kept. The cattle, however, are materially improved, and the formerly desolate appearance of the country is essentially changed.

The neat stock of Dumbartonshire may be divided into three classes: those that are wintered in the county, those that are fattened there, and the dairy cattle; for few are bred there beyond the annual consumption.

The portion of land appropriated to the wintering of cattle is the natural pasture, or uncultivated ground, of which there is a great deal. The grass is long and coarse, but it will be eaten by cattle that have not been accustomed to any thing better; and it is generally contrived that some part of it shall be a little sheltered from the blast. Many West-Highlanders, and principally from Argyle, are purchased in October or November, and chiefly at Falkirk market, and they are turned in the wintering grounds* without any other provender, until the winter thoroughly sets in, and the ground is covered with snow; they are then fed on coarse hay or straw given in the field, on some sheltered spot. It is thrown carelessly down, and the strongest beast gets the better share, and part of it is trodden under foot and spoiled.

There is often barely sufficient of this coarse hay and straw to last through a winter of moderate length, and, therefore, after one of unusual severity, the cattle, although not so reduced as we have described them to be in some parts of the Highlands, are brought to market in poor condition, and sold at a very inferior price.

A few cattle are wintered in the straw-yard, but they fare not much better, for they rarely get turnips, they have straw only, or this coarse bog-hay, and they do not thrive so well upon it as if they were turned on the pasture, scanty as it is.

In April or May they are usually sold to the dealers, who drive them farther south. They are generally two-year-olds which go through this process, and the owner of the coarse pasture is fairly repaid by the growth of the cattle, and the greater price which beasts even of the same size obtain in May, above that which would be given for them in November.

Thus commences the succession of journeys and stages of improvement which a great proportion of the Highland cattle pass through. Messrs. Whyte and Macfarlane thus speak of it in their 'Survey of Dumbartonshire:'—'The reader will perceive here some traces of that extensive distribution of labour, in the management of stock and the application of grass ground, which is at once most profitable to individuals, and economical to the public. The cattle bred in the West Highlands are, at the age of two years, or two years and a half, removed into Dumbartonshire and the neighbouring counties. At three years old they are carried to the northern counties of England, and so by degrees southward, enjoying at each remove a milder climate and a richer pasture than before, till they attain their full size, and reach the butcher in prime condition. By this arrangement the power, so to speak, which each district of land possesses in breeding, rearing, or fattening, is fully called into action; the cattle are exposed to no sudden or violent change, but their situation is from time to time altered in a moderate degree for the better; their rapid growth and continued improvement afford a reasonable profit to each grazier through whose hands they pass, and, after all, they are brought to market much cheaper than if every beast had remained until it was fit for being killed on the soil where it was originally bred.'

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* These wintering grounds are usually bog-meadows, which are formed by the filling up of lakes and deposits of water, in consequence of the gradual accumulation of vegetable matter, and which, at length, attain a sufficient degree of solidity to bear the cattle. The herbage is at first of the coarsest nature, but it gradually improves, and, although sheep will not eat it, becomes a valuable part of the farm, and the chief support of the cattle both in summer and winter. On the edges of most of the high sheep-pastures, there are slips and tracts of land on which the sheep will not feed, but on which cattle readily thrive.

The profit derived from the cattle thus wintered must vary with a great many circumstances, and especially with the length and severity of the winter and the change of price in the market, but the Dumbartonshire grazier is supposed to get about 25*s.* by each beast.

Some cattle are fattened altogether in Dumbartonshire, and, perhaps, originally bred there. These also are West Highlanders. If the pasturage, although coarse, is abundant and nutritive (for these moory grounds often yield much good produce,) the cattle remain on the same enclosure, or they are removed to other fields that are not so closely eaten down, and when the flush of grass comes, they grow and fatten at a most rapid rate.

Some of the farms do better for summer than for winter fattening, and then the Highlanders, or some old oxen or cows, are bought from their neighbours, or at the surrounding markets, and turned on this natural grass, which is changed, in due time, for the aftermath of the clover, or, in a few instances, they are turned at once into the best pasture, when a portion of it can be spared from the cows. In November they are fit for the butcher, and average from twenty-five to thirty stones. The profit on this summer grazing varies in different seasons, but cannot be computed at less than 50*s.* per head.

In a few parts of the country the North Highlanders have been tried, as being cheaper than the others, but they have not fattened so kindly, nor so well repaid the prime cost, and expense of keeping.

Stall-feeding has been introduced, and has answered well, particularly as consuming the better kind of grass to much greater advantage than if it were eaten down; and likewise converting the turnip crop to the most profitable use. On rich ground, and with much artificial food, it is a method of feeding which will gradually supersede the pasturing in the field; but, in a district like this, the coarse grass and the fog-hay would not be in any other way consumed than by the old method of summer and more particularly of winter feeding.

The Highlanders never answered for the dairy, and therefore would not be kept for this purpose in so populous a county as Dumbartonshire, and more especially the small and inferior variety which passes under the name of the native cow. Some attempts have been made to cross her with the Fife, and afterwards with the Ayrshire cattle, but they did not perfectly succeed; and the true Ayrshires have gradually established themselves in the greater part of the dairies. They used to be purchased from the neighbouring counties of Renfrew and Ayr, but the greater part of them are now bred in Dumbartonshire, and are in no way inferior to the original stock; or rather, when properly managed, they are more valuable to the dairyman, for it is not often that a cow will thrive anywhere so well, or yield so much milk as in the country, and even on the farm in which she was bred: and, most certainly, in cases of disease the stranger cow is lost much oftener than the one that is breathing her native air.

In winter the milch cows are fed on straw with turnips or potatoes, and are let out once in the day for water and exercise; but as soon as they become dry the turnips and potatoes are too often withdrawn, and the poor animals are fed on straw alone. This is done from the absurd idea that the succulent food is relaxing, and apt to make them calve before their time; whereas they are improperly weakened at the time, when, if it is dangerous for them to be in full condition, they should at least be in good plight; in addition to this, the continuance of dry food will prevent the natural flush of milk at the time of calving.

During the summer months the milch cow is in the field during the night, but sheltered from the flies, and supplied with green meat in the cowhouse during the day; and when the flies cease to torment, and the nights become cold, they are housed during the night, and graze at liberty in the day.

This county, and the whole of the district including part of Stirlingshire and Perth, is much indebted to the patriotic exertions of the Duke of Montrose. His Grace's factor, Mr. Geekie, informs us, that as late as the year 1817, the dairy cattle was of a very inferior kind—small, coarse, unshapely, and possessing few of the qualifications requisite in a dairy stock. The Duke of Montrose and the principal landed proprietors of the district, then formed themselves into a society, for the express purpose of the improvement of cattle, and the introduction of the Ayrshire breed. High premiums were offered for the best bulls and cows which had been bred out of this district. Liberal donations were added by the Highland Society of Scotland. Great emulation was thus excited among the tenantry, and the desired effect was produced of introducing many excellent animals from Ayrshire and Lanarkshire; their progeny became naturalized here, and, for the reasons just stated, they are even more valuable than the original breed.

The produce of a good Ayrshire cow, bred in Dumbarton, is fully equal to that yielded by any of its progenitors. Mr. Geekie thus averages it:—

For the first three months after calving, 10 Scots pints daily.
For the second . . . 8 ,,
For the third . . . 3 ,,
For the next six weeks . . 1½: she is then dried;

having given, all the year round, more than 5½ Scots pints, or nearly 3 gallons daily.

The calves for the dairy are generally taken from their dams as soon as dropped, and fed with milk from the hand for about two months, the quantity of milk being gradually decreased when they begin to take other food. Linseed-tea is given in small quantities in order to keep the bowels in a proper state while under milk. Where there is other demand for the milk, bean or pease flour is gradually mixed with it or substituted for it. After the calves are weaned they are turned on good pasture, and during the first winter are housed, and fed on oat-straw or meadow-hay, with, at least once in every day, some turnips cut and mixed with the dry food.

During the second summer they should have better pasture than they usually get, or they will not be raised sufficiently in size; and in the second winter they are generally, and always should be, housed: a few agriculturists, who study their own interests, as well as the comfort of their cattle, allow them some turnips in addition to their straw and hay. On the third summer inferior pasture is sufficient, or they will get too fat, but in the third winter they should be well kept, and particularly in the spring and until they have calved.

Heifers at three years old will weigh from twenty-eight to forty-five stones imperial weight; the ox will average, at that age, from forty-five to fifty-five stones, but some have weighed 130 stones.

Oxen have gradually given way to horses on the road and for husbandry work, and there is now scarcely a team employed in the whole county.

The statistical account assigns 9120 as the number of cattle in Dumbartonshire, being not more than one to every sixteen acres. If these are averaged at 6*l.* per head, the value of the cattle will be 54,720*l.*

RENFREWSHIRE.

Renfrewshire is on the Firth of Clyde, and south of Dumbartonshire. Its greatest length is only thirty-one miles, and its breadth thirteen miles, and it is decidedly a manufacturing county, three-fourths of the inhabitants living in the small towns. It contains 10,000 cattle, or about one to every fifteen acres; so that a sufficient number only are kept for the purposes of the dairy, and scarcely enough for the consumption of beef.

The Highland cow is rarely met with; she has been properly superseded by the dairy cow of Scotland, the Ayrshire.* The Alderney was tried, as promising to be valuable in a dairy county, from both the quantity and quality of her milk, but she was not found to answer. She was crossed, but with no success, by the native bull. The Durham was afterwards attempted, and the Alderney crossed with it; but, except on a few estates, all have given way to the Ayrshire. The Ayrshire breed has been materially improved in Renfrewshire within the last twenty years, not so much, perhaps, in size as in fineness of bone and beauty of form. There was long a very great error in the Renfrew system of management; four-fifths of the calves were sold almost as soon as they were dropped, and the stock was kept up by purchasing from Ayrshire. It is true the whole milk of the cow was thus preserved, and that was an object of great importance in a dairy country; but the breed of cows in Renfrew suffered to a certain degree. The farmer did not systematically rear the calves of those cows which from experience he knew to be the best, and thus secure the improvement of his stock, but he trusted to the chance of purchase, which was a perfect uncertainty, whatever judge of cattle he might be; and supposing him to be always so fortunate as to select a good milker, he had moved her from her native place, and, with the exception, perhaps, of the Ayrshire cow, oftener than any other, he had, to a much greater degree than some imagine, lessened her value. To a considerable extent, this practice has been rectified, but there are still yet too many dairymen who look more to present convenience and profit than to distant although not uncertain advantage.

A great deal of the milk supplies the dense population of Paisley and Greenock, and also of Glasgow, which is close on the borders of the county. The remainder is manufactured into butter, with which these and the other towns are supplied, and which is often made from the milk, instead of waiting for the separation of the cream. The remainder goes to the making of cheese, than which Scotland cannot produce any better. It is known under the name of the Dunlop cheese, but no great quantity of it has for some years past been made. The greater part of it is manufactured in Ayrshire, as will be presently described. The population is far too dense for a cheese dairy, and the farmer can find a readier and more profitable sale for his milk.

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* The Rev. Mr. Maxwell, in his Statistical Account of Kilbarchan (1799,) in this county, unknowingly proves that the Ayrshire cow was early introduced here when he says, 'The cows most esteemed here are those of a small mouth, head and neck long and small. With respect to colour, those spotted brown and white are preferred.' The Rev. Mr. M'Latchie, in his account of Mearns, in 1796, says, 'Most of the cows here are of a middle size, and of a brown and white colour. They give from ten to fifteen Scots pints of milk per day.

Sir Michael Stewart, to whom we owe some useful information, is of opinion that the Ayrshire cow has not been deteriorated by her removal to Renfrew; that during eight months in the year she will, on the average, yield four gallons of milk per day, and will produce nearly one pound of butter daily, and that, although used almost exclusively for the dairy, she is only inferior to the West Highlanders for grazing.

Mr. Wilson, who compiled the survey of this county, says, 'The dairy seems at all times to have been an important object in Renfrewshire.' Crawford, who wrote his history a century ago, says, 'The higher parts of the county abound with grass, and choice pasturage, where there is made excellent butter and cheese; and besides what is made use of in the county, there are considerable quantities carried to the neighbouring shires; and the rents of the extensive property in Lockwinnoch parish, which belong to the abbey of Paisley, were paid in *sticks* and *cheese*.'

The Renfrew dairymen manage their cattle better at calving time than those of Dumbartonshire, for while they are allowed potatoes with their straw during winter, the quantity of succulent food is increased as the time of calving approaches, in order to prepare for an increased flow of milk, which, if not wanted for the calf, is profitable to the dairyman.

The calves usually get three gallons of new milk daily for about two months: they are then put on young grass for six months, and upon inferior pasture for the next eighteen months; after which, when supposed to be in calf, they are fed along with the dairy cows. The summer feeding for grazing cattle consists chiefly of grass in the field, with vetches or clover in the house. The winter feeding consists of turnips and potatoes boiled or steamed with chaff or cut hay, or the turnips and potatoes given raw, with straw and meadow hay. In spring, bean-meal is frequently mingled with these. Near distilleries a great deal of draff and dreg is used at all seasons.

The Renfrewshire Agricultural Society, which holds its annual meeting at Paisley; has contributed very materially to the improvement of the cattle in this district.*

AYRSHIRE.

THIS county extends along the eastern coast of the Firth of Clyde, and the North Channel from Renfrew to Wigtownshire, by the former of which it is bordered on the north, and by the latter on the south, while it has Kircudbright, Dumfries, and Lanark on the east. It is necessary to mention this, in order that the reader may better comprehend the rapid distribution of the Ayrshire cattle over all these districts. The climate is moist but mild; and the soil, with its produce, is calculated to render it the finest dairy country in Scotland, and equal perhaps to any in Great

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* A district society, consisting of the parishes of Kilmalcolm, Port Glasgow, Greenock, and Inneskip, in Renfrewshire, and Largs, in Ayrshire, has since started in honourable rivalry, under the patronage of the Highland Society. The show is held at Greenock in the first week in August. In 1830, one hundred guineas were distributed in prizes for the best cattle, horses, sheep, and swine: 89 Ayrshire cattle, 12 West Highlanders, 28 sheep, and 17 horses were exhibited—making a total of 166; and the number of competitors was 57. In 1831, 115 Ayrshire cattle, 18 West Highlanders, 86 sheep, and 40 horses were exhibited:—total 259; and 62 competitors. In 1832, 110 Ayrshire cattle were shown, 14 West Highlanders, 160 sheep, and 33 horses:—total 317; and 63 competitors. For information respecting this branch society, we are indebted to Claud Marshall, Esq., of Greenock, a very active member of the parent one.

Britain. There is a great deal of permanent pasture on the sides and tops of the hills, which is covered by sheep; but the greater part of the arable land is pasture and crop alternately. The pasture-ground is occupied by the beautiful dairy-stock, a very small portion of it being reserved for the fattening of cows too old to milk.*

Ayrshire is divided into three districts;—that lying on the south side of the river Doon is called the Bailiary *Carrick*—the country between the Doon and the Irvine is the Bailiary of *Kyle*, and the district on the north of the Irvine is *Cunningham*. It is this last division which lays principal claim to be the native country of the Ayrshire cattle, and, indeed, they went by the name of the Cunningham cattle before these three Bailieries were united into one county under the name of Ayr.

Mr. Aiton, in his 'Treatise on the Dairy Breed of Cows,' (the most valuable work on the Dairy husbandry of the north, and on Dairy husbandry generally, that has yet been published,) thus describes the Ayrshire cattle (p. 26)—'The *shapes* most approved of in the dairy breed are as follows:—

'*Head* small, but rather long and narrow at the muzzle; the *eye* small, but smart and lively; the *horns* small, clear, crooked, and their roots at considerable distance from each other; *neck* long and slender, tapering towards the head, with no loose skin below; *shoulders* thin; *fore-quarters* light; *hind-quarters* large; *back* straight, broad behind, the joints rather loose and open; *carcass* deep, and *pelvis* capacious, and wide over the *hips*, with round fleshy *buttocks*.† *Tail* long and small; *legs* small and short, with firm *joints; udder* capacious, broad and square, stretching forward, and neither fleshy, low hung, nor loose; the *milk veins* large and prominent; *teats* short, all pointing outwards, and at considerable distance from each other; *skin* thin and loose; *hair* soft and woolly. The *head*, *bones*, *horns*, and all parts of *least value*, small; and the general *figure* compact and well proportioned.'

Mr. Aiton also informs us, that 'the Ayrshire farmers prefer their dairy-bulls, according to the feminine aspect of their heads and necks; and wish them not round behind, but broad at the hook-bones and hips, and full in the flanks.' (p. 27.) Experience, and that rather dearly bought by the dairyman, led to this, for the consequence of the crossing of the small native breeds, with the heavy cattle imported from the south, was the production of a bony, ill-shaped animal, not much improved as a milker, and its disposition to carry fat lamentably decreased; it may, however, demand consideration whether the round and compact form of the West Highlander and the Galloway have not been rather too much sacrificed, and even the defects of the short-horn needlessly perpetuated.

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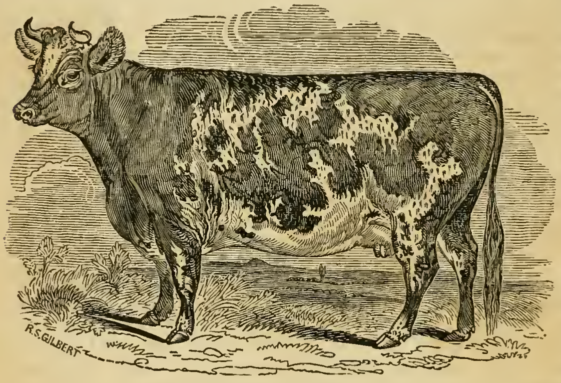
* It may not be uninteresting to contrast the present improved state of agriculture and agriculturists with what it was eighty or ninety years ago. Colonel Fullerton, in his 'Survey of Ayrshire,' thus describes it:—'There was scarcely a practicable road in the county;—the farm-houses were mere hovels moated with clay, having the open hearth or fire-place in the middle, the dunghill at the door, the cattle starving, and the people wretched. The land was overrun with weeds and rushes, and gathered into high broad serpentine ridges—the soil collected on the top of the ridge, and the furrow drowned with water—no fallows—no green crop—no sown grasses—hardly a potatoe, or any other esculent root—no garden vegetables, unless a few Scotch kail; little straw; no hay, except a scanty portion of the coarsest quality collected from the bogs—little or no available dung—no carts or waggons to convey it to the land, but the ground scourged with oats after oats as long as it would pay for seed and labour, and afford a small surplus of oatmeal for the family, and then was left in a state of absolute sterility, or overrun with thistles, until rest again enabled it to produce a scanty crop. No dung was ever spread on the out-field; the starved cattle were suffered to poach the fields from the end of harvest until the ensuing seed-time—thus the natural grass was cut up, or drowned with water standing in the cattle's footsteps. As there were few or no enclosures, the horses were either tethered during the summer months, or loose as well as the cattle, but under the tendency of a boy and a cur-dog, and the poor animals were kept in constant agitation, and impelled by starvation to fly from their bare legs. Thus the poor cattle, starved during the winter in the houses, and perpetually harassed during summer in the fields, were never in a fit condition for the market; the finest lands were let for two or three shillings per acre; and there was neither skill, capital, industry, nor credit to do away all this wretchedness.'

† Mr. Rankine very properly remarks, that, 'compared with other improved breeds, the thighs, or what is called the twist of the Ayrshire cow, are *thin*. She is, characteristically, not a *fleshy* animal.'

Mr. Aiton adds, in his 'Survey'—'The *qualities* of a cow are of great importance. Tameness and docility of temper greatly enhance the value of a milch-cow. Some degree of hardiness, a sound constitution, and a moderate degree of life and spirits are qualities to be wished for in a dairy-cow, and what those of Ayrshire generally possess. The most valuable quality which a dairy-cow can possess is, that she yields much milk, and that of an oily or butyraceous, or caseous nature, and that after she has yielded very large quantities of milk for several years, she shall be as valuable for beef as any other breed of cows known; her fat shall be much more mixed through the whole flesh, and she shall fatten faster than any other.' This is high praise, and if it can be truly affirmed of the Ayrshire cattle, we are naturally anxious to know the origin, the progressive history, and the general management of this valuable animal.

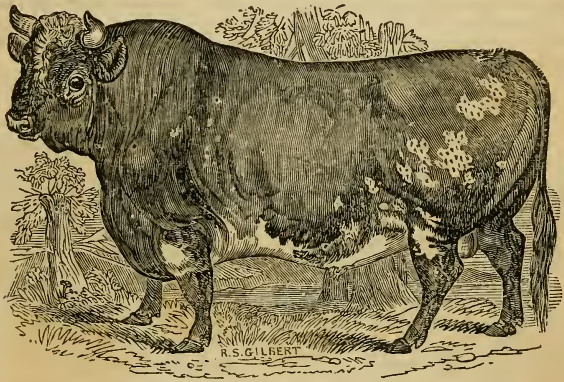


[*The Ayrshire Cow.*]

The origin of the Ayrshire cow is even at the present day a matter of dispute; all that is certainly known about her is, that a century ago there was no such breed in Cunningham, or Ayrshire, or Scotland. Did the Ayrshire cattle arise entirely from a careful selection of the best of the native breed?—if they did, it is a circumstance unparalled in the history of agriculture. The native breed may be ameliorated by careful selection, its value may be incalculably increased—some good qualities—some of its best qualities—may be for the first time developed; but yet there will be some resemblance to the original stock, and the more we examine the animal, the more clearly we can trace out the characteristic points of the ancestor, although every one of them improved.

Mr. Aiton gives the following description of the Ayrshire cattle fifty years ago:—'The cows kept in the districts of Kyle and Cunningham were of a diminutive size, ill-fed, ill-shaped, and they yielded but a scanty return in milk; they were mostly of a black colour, with large stripes of white along the chine or ridge of their backs, about their flanks, and on their faces. Their horns were high and crooked, having deep ringlets at the root, the plainest proof that the cattle were but scantily fed; the chine of their backs stood up high and narrow: their sides were lank, short and thin; their hides thick, and adhering to the bones; their pile was coarse and open; and few of them yielded more than three or four Scotch pints of milk per day, when in their best plight; or weighed, when fat, more than from twelve or sixteen to twenty stones avoirdupois, sinking offal.'—p. 19.

He very naturally adds—'It was impossible that these cattle, fed as they then were, could be of great weight, well shaped, or yield much milk. Their only food in winter and spring was oat-straw, and what they could pick up in the fields to which they were turned out almost every day, with a mash of a little corn with chaff daily for a few weeks after calving, and their pasture in summer was of the very worst quality; and that coarse pasture was so overstocked, and eaten so bare that the cattle were half-starved.'



[*The Ayrshire Bull.*]

If Mr. Aiton's description of the present improved Ayrshire is correct, the breed is very much changed, and yet there is so much indistinct resemblance, that a great deal of it must have been done by careful selection, from among the native cattle, and better feeding and treatment; but when we look closer into the matter, the shortness, or rather diminutiveness of the horns, their width of base, and awkward setting on—the peculiar tapering towards the muzzle; the narrowing at the girth; the bellying; and the prominences of all the bones—these are features which it would seem impossible for any selection from the native breed to give. While therefore the judge of cattle will trace the features of the old breed, he will suspect, what general tradition confirms, that it was a fortunate cross, or a succession of crosses with some foreign stock, and that, probably, it was the Holderness that helped to produce the improved Cunningham cattle.

In many a district the attempt to introduce the Teeswater breed, or to establish a cross from it, had palpably failed, for the soil and the climate suited only the hardihood of the Highlander; but here was a mild climate—a dairy country; the Highlander was in a manner out of his place; he had degenerated, and the milking properties of the Holderness, and her capability of ultimately fattening, although slowly, and at considerable expense, happily amalgamated with his hardihood, and disposition to fatten, and there resulted a breed, bearing about it the stamp of its progenitors, and, to a very considerable degree, the good qualities of both.

Mr. Robertson, in his 'Rural Recollections,' says—'Who introduced the present breed is not very precisely ascertained, but the late Colonel Fullarton, whose account of "*The Husbandry of Ayrshire*," which was published in 1793; and whose authority is of considerable weight in everything relating to it, states, that a gentleman of long experience, Mr. Bruce Campbell, asserts that this breed was introduced by the late Earl of Marchmont.' The Earl of Marchmont alluded to must have been that Alexander Hume Campbell, who married Margaret Campbell, heiress of Assnoch, in the same parish, and who became Earl of Marchmont in 1724, and died in 1740. The introduction, then, of this dairy-stock must have happened between these two dates, and so far corresponds with the traditionary account.

Mr. Robertson goes on to say, 'from what particular part of the country they came there appears no evidence. My own conjecture is, that they are either of the Holderness breed, or derived from it; judging from the varied colour, or, from somewhat better evidence, the small head and slender neck, in which they bear a striking resemblance to them.'*

These cattle, from which, by crosses with the native breed, the present improved Ayrshire arose, were first introduced on Lord Marchmont's estates in Berwickshire. They were soon afterwards carried to the farms belonging to the same nobleman at Sornbergh in Kyle. A bull of the new stock was sold to Mr. Hamilton of Sundrum; then Mr. Dunlop in Cunningham imported some of the Dutch cattle, and their progeny was long afterwards distinguished by the name of the Dunlop cows. These were the first of the improved, or stranger breed that reached the bailliery of Cunningham. Mr. Orr, about the year 1767, brought to his estate of Grongar, near Kilmarnock, some fine milch cows of a larger size than any which had been on the farm. It was not, however, until about 1780 that this improved breed might be said to be duly estimated, or generally established in that that part of Ayrshire; although they had begun to extend beyond the Irvine into Kyle. About 1790, according to Mr. Aiton, Mr. Fulton from Blith carried them first into Carrick, and Mr. Wilson of Kilpatrick was the first who took them to the southern parts of that district. So late as 1804 they were introduced on the estate of Penmore, on the Stonchar, and they are now the established cattle of Ayrshire: they are increasing in the neighbouring counties, and have found their way to most parts of Britain.

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* Some breeders, however, have maintained that they were produced from the native cow, crossed by the Alderney bull. It requires but one moment's inspection of the animals, to convince us that this supposition is altogether erroneous.

In Rawlin's 'Complete Cow-doctor,' published at Glasgow, in 1794, the following account is given of the Ayrshire cattle at that time—'They have another breed called the Dunlop cows, which are allowed to be the best race for yielding milk in Great Britain or Ireland, not only for large quantities, but also for richness in quality. It is said to be a mixture, by bulls brought from the Island of Alderney, with their own cows. These are of a small size, not weighing more, upon an average, than from 24 to 30 stones. These are allowed to yield more milk daily than any other kind of cattle, when a just comparison is made of their size and pasture. They are much leaner and thinner than any other of the Scotch or English breeds, when in the best grass. They are not deemed a race of handsome cattle, but rather the contrary, being shaped more like the Dutch breed than any of the natives of Scotland. Their horns are small, and stand remarkably awkward; their colour is generally pied or of a sandy red, varying in this from all other races.'—P. 66.

The breed has much improved since Mr. Aiton described it, and is short in the leg, the neck a little thicker at the shoulder, but finely shaped towards the head; the horns smaller than those of the Highlanders, but clear and smooth, pointing forwards, and turning upwards, and tapering to a point. They are deep in the carcass, but not round and ample, and especially not so in the loins and haunches. Some, however, have suspected, and not without reason, that an attention to the shape and beauty, and an attempt to produce fat and sleeky cattle, which may be admired at the show, has a tendency to improve what is only their second point—their quality as grazing cattle—and that at the hazard or the certainty of diminishing their value as milkers. The statistical account assigns 61,000 cattle to Ayrshire, of which more than half are dairy-cows. The average will be one beast to every fifteen acres.*

We agree with Mr. Aiton, that the excellency of a dairy cow is estimated by the quantity and the quality of her milk. The quantity yielded by the Ayrshire cow is, considering her size, very great. Five gallons daily, for two or three months after calving, may be considered as not more than an average quantity. Three gallons daily will be given for the next three months, and one gallon and a half during the succeeding four months. This would amount to more than 850 gallons; but, allowing for some unproductive cows, 600 gallons per year may be considered as the average quantity obtained annually from each cow. We shall enter more into this presently.

The disposal of the milk varies according to the situation of the farm and the character of the neighbourhood. If it is sold as new milk, at 8*d.* per gallon at the first hand, the produce of the cow will be 20*l.* per annum. Some imagine that the profit will be greater if employed in the fattening of calves. Others at a distance from any considerable town, convert it into butter or cheese.

The quality of the milk is estimated by the quantity of butter or cheese that it will yield. Three gallons and a half of this milk will yield about a pound of butter, country weight, or a pound and a half avoirdupois; and when one gallon of water is added to four of milk, the butter-milk is worth to the farmer, or will sell at, 2*d.* per gallon. An Ayrshire cow, therefore, may be reckoned to yield 257 English pounds of butter per annum, or about five pounds per week all the year round, beside the value of the butter-milk and her calf.

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* Mr. Robertson, who, in 1819, examined all the farms in Cunningham, found the number of milch cows to be 12,563, and that of *yell* cattle (those not in milk) of all ages to be 8991, making a total of 21,554. 'I should conceive,' he says—('Rural Recollections, p. 573,')—'that not more than the odd 1554 would be Highland stots, or other yell cattle, bought in at Dumbarton, or other Highland fairs for grazing in gentlemen's parks, or in cattle-dealers' pastures for feeding or for sale; and that the rest would be of the native breed of Cunningham, and consisting of about 437 bulls, 12,563 dairy-cows, and 7000 young cattle of all descriptions under the third year for keeping up the stock. Of these a very considerable proportion are annually sold, and particularly of the *etterlins*, or quays in calf in their third year, and also of milch cows of all ages. From 1200 to 1500 cows are sold annually out of the county in Cunningham alone. They bring a very considerable price, and this probably, combined with the yearly produce of the dairy, is, perhaps, little less than the amount of all the land-rents.'

When the calculation is formed, according to the quantity of cheese that is usually produced, the following will be the result:—twenty-eight gallons of milk, with the cream, will yield a stone (24lbs.) of sweet-milk cheese, or 514 lbs. avoirdupois per annum, beside the whey and the calf.*

This is certainly an extraordinary quantity of butter and cheese, and fully establishes the reputation of the Ayrshire cow, so far as the dairy is concerned.†

It is the practice in many parts of Ayrshire to *let* the cows to a professed milkman at so much per cow per annum. This is provincially called a *bowing*, or *boyening*, from *boyen*, a milk-pail. The farmer provides the cows and requisite dairy-vessels, the whole summer pasture and winter foddering, and houses and litter for the cows, and a habitation for the milkman; while the *boyener* takes the whole charge of the milking, and the management and disposal of the butter, or milk, or cheese, or whey, as he chooses. The price varies from 8*l.* to 15*l.* In the neighbourhood of large towns it may be averaged at 15*l.*; and if to this be added the wages of a milkman or milkmaid for every eight cows, the whole expense of the cow will be 18*l.*; and the money received, at 10*d.* per gallon, for 600 gallons, being but 26*l.*, there will result only 7*l.* per annum profit on each cow; but this supposes that the milk of the cow is fairly disposed of without adulteration or trickery.‡ Mr. Aiton rates the profit of the Ayrshire cow

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* A Scotch pint is nearly two English quarts. An Ayrshire pound consists of 24 ounces, and sixteen of these pounds, or 24 lbs. avoirdupois, make a stone. Mr. Fullarton, in his 'Statistical Account of Dulry,' in this county, states that in 1794, before the establishment of this improved Ayrshire cow, each cow would yield, on the average, in the course of the season, 18 stones, or 288 lbs. of sweet-milk cheese.

† In some experiments conducted at the Earl of Chesterfield's dairy at Bradley-Hall farm, it appeared that, in the height of the season, the Holderness would yield 7 gallons and a quart; the long horn and the Alderney, 4 gallons 3 quarts; and the Devon, 4 gallons 1 pint per day: and when this was made into butter, the result was, from the Holderness, 38½ ounces; from the Devon, 28 ounces; and from the Alderney, 25 ounces. The Ayrshire yields 5 gallons per day, and from that is produced 34 ounces of butter.

‡ Mr. Robertson gives a curious extract from the farm-book of Mr. David Blair, of Giffordland, in this county, dated 1743:—

'Mind that P. Lawson farmed 7 cows at 8 pounds each (13*s.* 4*d.* the Scots pound being equivalent to 1*s.* 8*d.*) She entered to the milk on the 21st of May, to the end of harvest.

'She made of sweet-milk cheese 9¾ stone, at 2*l.* 0*s.* 10*d.*	£19	10	0
6¾ stone of butter, at 2*l.* 13*s.* 4*d.*	18	0	0
11½ stone, of common cheese, at 1*l.* 6*s.* 8*d.*	15	6	8
Milk and cream to the house	6	0	0
Scots	£58	16	8

'She also sent ½ stone sweet-milk cheese to Glasgow, in a compliment.—*Rur. Recollec.*, p. 62.

The woman gained 2*l.* 16*s.* 8*d.* Scots, or 4*s.* 8*d.* by her bargain, and the system of *bowing* or *boyening* was not again attempted during the period of thirty-six years, which this book embraces.

This extract is interesting, as showing the improvement of the Ayrshire cow since that period. These cows were taken at the very height of the season; and yet, reckoning 9 Scotch pints for a pound of butter, or 4½ pints for a pound of cheese, and that the season lasted twenty weeks, they scarcely yielded 3 pints (1½ gallon) each per day. It is a bad Ayrshire cow that does not now yield three times that quantity.

The same book, extending from 1729 to 1765, also records the amount of wages:—

	1729—1742.	1743—1759.	1760—1765.
A ploughman, yearly	£2 13 4	£3 6 8	£3 10 0 to £5 0 0
A maid servant „	1 6 8	1 10 0	1 10 0 to 2 0 0

In more modern times, in that part of the country, the wages were as follows:—

	1796.	1828.
A ploughman, yearly	£12 0 0 to £16 0 0	£14 0 0 to £18 0 0
A maid servant „	5 0 0 to 6 0 0	6 0 0 to 9 0 0

at a higher value. He says, 'To sum up all in one sentence, I now repeat that hundreds and thousands of the best Scotch dairy cows, when they are in their best condition and well fed, yield at the rate of 2000 Scotch pints of milk (1000 gallons) in one year; that, in general, from $7\frac{1}{2}$ to 8 pints ($3\frac{3}{4}$ to 4 gallons) of their milk will yield a pound of butter, county weight ($1\frac{1}{2}$ lb. avoirdupois); that 55 pints ($27\frac{1}{2}$ gallons) of their milk will produce one stone and a half imperial weight of full milk-cheese; that at the proper season, and when a healthy calf is fed, and the prices of veal as high as they have frequently been within the last fifteen years, milk will yield a profit in veal equal to $3\frac{1}{2}$*d* or 4*d*. per pint ($\frac{1}{2}$ gallon); and where the buttermilk can be sold that will yield a similar profit.

Mr. Rankine, the author of an excellent report of a Kyle farm (in the Reports of Select Farms, No. 2, Farmer's Series, No. 12,) and some of whose observations, with which we have been privately favoured, we have embodied in our account of the Ayrshire cattle, very justly, we think, maintains that Mr. Aiton's statement is far too high, and his calculations not well founded. 'He deduces his statement,' says Mr. Rankine, 'from the circumstance of some farmers letting the milk of their cows for a year at 15*l*. and 17*l*., which, taking 60 pints (half-gallons) to produce an Ayrshire stone (24 lbs.) of cheese, and the price being 10*s*., would require 2160 pints for each cow. But he is not warranted in inferring that the milk from which these rents were paid was all converted into cheese. I am convinced that no such rents were ever paid for cows where a considerable portion of the milk was made into cheese. In the vicinity of a town where the whole of the milk could be sold for 4*d*. a pint (half gallon), 900 pints would bring 15*l*. Where the whole of the milk could have been turned to such an account, such rents might have been paid; but it is erroneous to calculate the quantity of milk given from the quantity of cheese required to enable a rent of 15*l*. to be paid. His first statement (page 110 of this work) that 1200 Scots pints (600 gallons) are yielded, though far above the average of all the cows in the county, may be too low when applied to the best-selected stocks and on good land, but I have reason to believe that no stock of 20 cows ever averaged 1800 or 1700 pints (900 or 850 gallons) each in the year. I have seen eighteen pints of milk drawn from a cow in one day. I had a three-year-old quey that once, for six weeks after calving, gave 14 pints a day. The dairymaid predicted that there "had been o'ermuckle talk about her, for ony luck to come of her," and she soon afterwards received an injury in her udder, which caused one of her quarters to become dry of milk. These, however, are rare instances.'

'I quote with confidence,' Mr. Rankine proceeds, 'the answers to queries which I sent to two individuals. The first is a man of superior intelligence and accuracy, and who has devoted himself very much to dairy husbandry. He keeps between twenty and thirty cows, and his stock has for many years been the handsomest I ever saw, and his farm being close to a small town, he had every inducement to keep them in the highest condition that is requisite for giving the largest produce in milk. He states that, at the best of the season, the average milk from each is 9 Scots pints ($4\frac{1}{2}$ gallons,) and in a year 1300 Scots pints (650 gallons); that in the summer season 64 pints (32 gallons) of entire milk will make an Ayrshire stone (24 lbs.) of cheese; and 96 pints (48 gallons) of skimmed milk will produce the same quantity: and that 180 pints (90 gallons) will make 24 lbs. of butter.

Another farmer, in a different district of this county, and who keeps a stock of between 30 and 40 very superior cows, and always in condition, states that the average produce of each is 1375 pints ($687\frac{1}{2}$ gallons). My belief, on the whole, is, that although there may be Ayrshire cows capable of giving 1800 pints in the year, it would be difficult to bring half a score of them together; and that in stocks of the greater number most carefully selected, and liberally fed, from 1300 to 1400 pints is the very highest produce of each in the year.'

Mr. Rankine concludes with giving his experience on his own farm, the soil of which is of an inferior nature, and on which his cows produced about 1100 pints (550 gallons), and the receipts from which amounted to only 7*l.* 13*s.* 6*d.* per cow.

We have entered at considerable length into this, because it is of some importance to ascertain the real value and produce of this celebrated Scottish breed of cattle, and also to correct an error in an agricultural work, deservedly a standard one in Scotland, and which may otherwise be implicitly relied on.

We have spoken of the improvement which a cross with the Ayrshire has effected in some of the Welsh cattle; but the Ayrshire cattle are not yet sufficiently known, and cannot be procured cheap enough, or in adequate numbers, to undergo a fair trial in the south. Some of them have been tried in the London dairies. As mere milkers, they could not compete with the long-established metropolitan dairy cow, the short-horn. They yielded as much milk, in proportion to their size and their food, but not in proportion to the room they occupied, and the increased trouble which they gave from being more numerous in order to supply the requisite quantity of milk. They produced an unusual quantity of rich cream; but there was so much difficulty in procuring them, so as to keep up the stock, and the price asked for them was often so great, that they were comparatively abandoned.

The fattening properties of the Ayrshire cattle we believe to be a little exaggerated. They will feed kindly and profitably, and their meat will be good. They will fatten on farms and in districts where others could not be made to thrive at all, except partly or principally supported by artificial food. They unite, perhaps, to a greater degree than any other breed the supposed incompatible properties of yielding a great deal of milk and beef. It is, however, as Mr. Rankine well observes, on the inferior soil and the moist climate of Ayrshire and the west of Scotland that their superiority as milkers is most remarkable. On their natural food of poor quality they give milk abundantly and long, and often until within a few days of calving; but when they are moved to richer pasture, their constitution changes, and they convert their food more into beef. In their own country, a cow of a fleshy make, and which seldom proves a good milker, may be easily raised to 40 or 50 stones, and bullocks of three years old are brought to weigh from 50 to 60 stones. There is a lurking tendency to fatten about them which good pasture will bring to light; so that when the Ayrshire cow is sent to England she loses her superiority as a milker, and begins to accumulate flesh. On this account it is that the English dealers who purchase the Ayrshire cows generally select the coarsest animals they can find, in order to avoid the consequence of the change of climate and food. It is useless to exaggerate the qualities of any cattle, and it cannot be denied that even in this tendency to fatten when their milk begins to fail, or which often causes it to fail, the Ayrshires must yield to their forefathers the Highlanders, and also to their neighbours the Galloways, when put on a poor soil; and they will be left considerably behind their short-horn sires when transplanted to luxuriant pasture. It will be long, perhaps, before they will be favourites with the butchers, for the fifth quarter will not usually weigh well in them. Their fat is mingled with the flesh rather than separated in the form of tallow; yet this would give a more beautiful appearance to the meat, and should enhance its price to the consumer.

Two circumstances, however, may partially account for their not being thought to succeed so well when grazed: they are not able to travel so far on the same keeping as the Highland cattle can do; and, from their great value as milkers, they are often kept until they are too old to fatten to advantage, or for their beef to become of the best quality.

Mr. Aiton gives an account of the treatment of the Ayrshire cow in large farms generally when he describes the management of that of his friend Mr. Ralston of Kirkum, in the county of Wigton.

'He keeps sixty milch cows at Kirkum, and nearly the same number at another farm a few miles distant: besides, he rears on one or two other farms thirty or forty young cows to keep up the stock and for sale. His cows are of the Ayrshire breed in its greatest perfection, and so well managed, that every milch cow on his farm yields him her own weight of the best cheese to be met with in Scotland, and for which he draws the value of the cow annually.

'Mr. Ralston keeps his cows constantly in the byre till the grass has risen so as to afford them a full bite. Many put them out every good day through the winter and spring, but they poach the ground with their feet, and nip up the young grass as it begins to spring, which, as they have not a full meal, injures the cattle. Whenever the weather becomes dry and hot, he feeds his cows on cut grass in the byre from six o'clock in the morning to six at night, and turns them out to pasture the other twelve hours. When rain comes, the house-feeding is discontinued. Whenever the pasture-grass begins to fail in harvest, the cows receive a supply of the second growth of clover, and afterwards of turnips strewed over the pasture-ground. When the weather becomes stormy in the months of October or November, the cows are kept in the byre during the night, and, in a short time after, during both night and day; they are then fed on oat-straw and turnips, and continue to yield a considerable quantity of milk for some time. Part of the turnip crop is eaten up in the end of harvest and beginning of winter to protract the milk, and part of them are stored up for green food during the winter. After they are exhausted the *Swedish* turnip and potatoes are used along with dry fodder till the grass can support the cows. Chaff, oats, and potatoes are boiled for the cows after calving, and they are generally fed on rye-grass during the latter part of the spring.' (Survey, p. 439.)

Mr. Rankine, in his account of his own farm of poorer ground, and deficient in winter food, (Farmer's Series, No. 12, p. 45,) enters more into particulars. 'In the end of autumn, when the nights become cold, they are kept in the house, after sunset, and get a little fodder; and from the middle of November until the pasture is again ready for them, they are fed entirely in the house, and let out only in fine weather to get water. They are regularly curried and kept as clean as possible. As there is not a sufficient quantity of green crop to supply them with succulent food, the milk is put off them as quickly after they are taken from the grass as it can with safety. Those that are to calve late in spring, and that are continuing to give a considerable quantity of milk, get a little extra feeding; the rest have straw alone. When the calving time approaches, they get chaff or cut-hay, boiled in a good deal of water, and enriched with a few potatoes or a little pea-meal, with hay to eat, in this way they go to the grass, which happens in general about the middle of May, in as good condition as when they left it. No food is found to produce so much effect as pea-meal, and will be profitably bestowed at the ordinary price of the grain, and though given in very moderate quantity.* Till the beginning of June they are seldom allowed to lie in the field during the night; but though they are protected as much as possible from cold, their houses are at all seasons kept well aired and cool.'

The advantage of feeding well in winter, and sending a cow to grass in good condition, is now generally understood; but the defect in practice is, that what can be afforded to the cows in this way is given only while they are in milk or when they calve. The return is, indeed, rendered more immediate, but it would be still more advantageous if a fair portion of the proper winter's food were given to the dairy cows after they were dry of milk.

Among smaller and poorer farmers, however, the Ayrshire cow undergoes more hardships than she should be exposed to. It is in the winter food that these people are most deficient, and the cows frequently have nothing besides oat-straw and bog-hay, or a very small quantity of turnips in the winter, and potatoes in the spring; so, that, when they are turned out to grass in May, they are very poor, and it is long before they give their proper quantity of milk, or the milk is good for any thing. It is well for them if there are any turnips left at winter, for in many cases these are all given in the autumn in order to preserve the milk a little longer. If the oat crop should fail, the cows of the small farmer fare hardly indeed. Mr. Aiton says that in 'in 1800 more than a third part of the cows and horses were killed for want of fodder. Nothing could be done but to kill part of the stock that the rest might be saved.'

Mr. Aiton ('Dairy Husbandry,' p. 31) gives a satisfactory account of the rearing of dairy stock. They are selected from parents of the best quality, and few are brought up that are not of the fashionable colour. Those are preferred that are dropped about the end of March or the beginning of April, as they are ready for the early grass, and attain some size before winter.

Calves reared for dairy stock are not allowed to suck their dams, but are always fed by the hand from a dish. They are generally fed on milk, only for the first four, five or six weeks, and are then allowed from four to five quarts of new milk, twice in the twenty-four hours (Mr. Rankine says 'from 10 to 12 quarts',) Some never give them any other food when young, except milk; and lessen the quantity when the calves begin to eat grass or other food, which they will generally do at about five weeks old: the milk is totally withdrawn about the seventh or eighth week of the calf's age. If, however, the calf is reared in the winter, or early in the spring before the grass rises, it must be longer supplied with milk, for it will not so soon learn to eat hay or straw. Some mix meal with the milk after the third or fourth week; others add new whey to the milk, which has been first mixed with meal; and when the calf gets two months old they withdraw the milk, and feed it on whey and porridge. Hay-tea, broths, of peas or beans, or of pea or bean straw, linseed beaten into powder, treacle, &c. have all been sometimes used to advantage in feeding calves; but milk, when it can be spared, is the most natural food.

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* Take a bushel of chaff, and eight or ten sound yellow or Swedish turnips, having the tops and tails carefully taken off: add a sufficient quantity of water, and boil them together four or five hours. Add as much water as will allow the hand to move easily through the mass. Squeeze down the turnips, and add three pounds of pea-meal. Give this to a cow in the morning, and the same in the evening, and as much sweet hay as she will eat up clean, five times a day; then, without much expense, her butter will be as rich, and of as fine a flavour as can be produced in winter. Should the peculiar flavour of the turnip be detected, which is not likely, a small quantity of saltpetre put to the cream will take it off.

The dairy calves are generally fed on the best pasture during the first summer, and have some preference over the other stock in food during the next winter, or they are allowed to run loose in a yard with a shed, and are supplied with green food in cribs. When the green food is eaten, they get with straw as many turnips as can be afforded them, and that is generally a very small quantity. Mr. Rankine says that 'there is no reason to doubt that this mode of feeding during the first season is preferable to pasturing. Besides the excellent dung produced, the animals arrive, under this treatment, at a much greater size.' From that time, until they drop their first calf, they are generally turned on inferior pasture, and are no better fed in winter than any other species of stock. They are allowed what oat-straw they can eat during the night and morning, and, except in time of snow, are turned out to the fields during the daytime. The greatest part of the young *dairy* stock are kept in byres or in sheds during winter, but some are laid out, and supported with straw in the fields.

There is nothing peculiar in the mode of manufacturing the Ayrshire butter, nor even the *sweet milk* or *Dunlop* cheese, so called from the district in Cunningham in which it was either first or best made. It is difficult to tell when it was first made, for a well-known rhyme says that, in the olden time, it was customary to look to

'Kyle for a man,
And Carrick for a cow,
Cunningham for butter and cheese,
And Galloway for woo'.'

Some have traced the secret to an old woman who returned from Ireland after the revolution of 1688: but the whole mystery consists in the richness of the milk; in the cheese being honestly made of the milk, cream and all, although strange stories are sometimes told of the pilferings of the cream, and the extent to which it may be carried without detection; in the milk being, as its name imports, perfectly sweet; in particular attention being paid to the temperature of the milk when the rennet is added (75 degrees, and that most accurately ascertained by the dairymaid's thermometer, the tip of her finger), and in the cheese being dried in a cool place, without any painting or sweating, or rubbing with grease or oil.*

The Dunlop sweet-milk cheese has a peculiar mild and rich taste, and also a frequent want of firmness; thus being readily distinguished from the harder, rougher, dryer Cheshire, and the mild and fatty but somewhat sticky Gloucester cheese.

The *skim-milk* or *common cheese*, is made in Ayrshire, as every where else, of the milk from which the cream has been separated.†

In Carrick chiefly, but not exclusively, many black cattle are grazed and fattened for the Scotch and English markets. They are mostly a peculiar breed, the history of which cannot be perfectly ascertained.

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* Mr. Aiton says, 'I had access to know that John Reid, tenant in Silverwood, in the parish of Kilmarnock, made full-milk cheese on that farm as early as the year 1750. It was made by John Love in Monkland in that neighbourhood, about the same period; but it was not until the year 1770, that any considerable number of the farmers in that or neighbouring parishes began to make full-milk cheese. ('Dairy Husbandry.')

† For a very interesting comparison, and one rich in practical information, between the manufacture of the Cheshire and Dunlop cheese, we refer to Mr. Aiton's invaluable 'Treatise on Dairy Husbandry,' and also to the 'British Husbandry' of the 'Farmer's Series.'

They are polled, yet they differ from the Galloways, and they differ as essentially from the Kyloes. An intelligent writer in the 'Farmer's Magazine' (1807) describes them as 'black, with long thick hair—their shape round and square, straight on the back, well limbed, and when standing upright, the more they have of the four-footed stool, they are esteemed the more perfect. Their general look and figure indicate strength and hardiness, and the finer and more perfect that figure is, the easier they are fed. They consist of stots and spayed queys, and of cows.'

The stots and spayed queys are purchased from the breeder at a year and a-half or two years old, and kept until they are three or four, when they are driven to England along with the Galloway droves. They are never in the house from the time they come from the breeder, but are fed in the fields on grass and hay until they are driven away.

The transfer of these cattle is carried on by the drovers and country-dealers (a kind of middle men between the Scotch and English dealers.) Some of them have a little capital to begin with, but others, at their outset, have only the credit of a fair character. Their common practice was to deal upon credit, by giving their bill for what they purchase, payable at three months: the grazier took this bill to a bank, endorsed it as a *cautioner*, and got the money. If the drover met with a ready market in England, he took up the bill when it became due—if not, the cautioner had the debt to pay.

In consequence of this mode of doing business, there was a great deal of speculation and risk; and when a great drover happened to fail, a whole country-side was almost laid waste. This mode of dealing yet continues to some extent, but the farmer, grown wise by experience, is now far more anxious to deal for ready money.

Some of the farmers in Carrick carry on an extensive business in grazing cows. They buy up those that are old, or which fail at the pail, or are not good breeders, and lay them on the pasture about Hallow-day, where they remain a year, when they are bought up by dealers or butchers for supplying the Edinburgh and Glasgow markets. They require grass of a better quality than the stots; they are fed in the open fields during the whole season; they seldom get turnips or other green food during the winter, but when the pastures begin to fail, hay and straw are given to them twice in the day until about the beginning of May.

On the heath covered mountains of the south and south-east extremities of Ayrshire a considerable number of black cattle are reared. They are of the same kind as those which we have just described; but even in the present improved state of husbandry, many more stock are kept on the ground than can possibly thrive, and there is a sad deficiency of wholesome, nourishing food during the winter.

In the beautiful village of Colmonell, on the banks of the Struchian, there are usually at least three thousand black cattle; the breeding of them is a great object in this part of the country, and their value has rapidly increased.*

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* A singular practice used to prevail in some parts of Ayrshire, and particularly in the neighbourhood of Largs.—The husbandry horses were hired during the winter and spring from the neighbouring districts, and after the ploughing and sowing were over, they were returned home, often in a poor state, to do the work of their ill-judging masters. The saving of fodder, and the earning of a little money, were the alleged excuses.

Mr. Lockart, in his statistical account of the parish of Lanark, gives an interesting account of the commencement of the inclosure and planting of Lanark-moor, which consisted of 1500 acres of land abandoned to heath and bent grass, in the neighbourhood of a populous

A few of the native wild cattle are found in Androssan park belonging to the Earl of Eglintown, and in Auchencruive park, the seat of Mr. Oswald. They are, however, suspected not to be in a state of perfect purity; they are of a cream colour, with black muzzles, and black or brown, or red ears.

Oxen are not worked, nor is there any creditable account of their ever having been worked, in Ayrshire; and the system of straw-yard feeding is seldom practised.

LANARKSHIRE, OR CLYDESDALE.

The latter name is derived from the river Clyde, which rises in the south-west on the borders of Peebles, and pursues its winding course for sixty miles through the heart of the county. The climate is mild, and severe frosts or snow are seldom of long continuance;—there is a great deal of natural pasture and meadow-land, fitting it to become an excellent dairy-country, and which has been its character for nearly a century.

Lanark is supposed to contain 30,000 cattle, all of which are connected with the dairy, except a very few that are bought in to feed on the summer pastures. The breed, as in the majority of dairy counties, is strangely various, according to the caprice, or skill, or ignorance of the occupier of the ground. They may, however, be divided into two classes—the Highlanders, with all their varieties and crosses, and the Ayrshires, which are gradually superseding everything else.

The dairy breed, on the borders of the Clyde, although of the Ayrshire stock, are somewhat altered by the difference and superiority of soil. They are longer and rounder in the chest, heavier in the fore-quarters, and less capacious behind; they appear to have materially improved in their grazing qualities, and yet, contrary to their usual character, they have not suffered much deterioration as milkers.

Mr. Aiton ('Dairy Husbandry,' p. 27,) says that 'Lord Belhaven kept at Wishaw-house for several years a bull of the dairy breed, of uncommon beauty; he was, however, a native of Beith, in the county of Ayr. He was longer and rounder in the chest, deeper in the ribs nearer to the shoulder, and his fore-quarters stronger and heavier than the bulls most approved of in the county of Ayr.' From him descended a great part of the Lanarkshire cattle. The fact was, that the richer soil of Lanark would maintain a heavier beast than that of Ayrshire: Lanark was not so decidedly and proverbially a dairy county; therefore this bull became

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and manufacturing town. Mr. Honeyman, advocate of Grœmsay, was the first who ventured to fen, or take on lease any great quantity of this common land. He obtained a grant from the magistrates of nearly 300 acres. Part of it he inclosed for pasturage, and the rest he planted with Scots pine and larch, and beech and ash; but he was violently opposed by some of the burgesses, who claimed an immemorial right of servitude upon this moor for the pasturage of a certain number of cattle, and for fuel, *seal* and *divot;* and it was long before they could be induced to accept a more than equivalent for this right.

He also states, that until after the middle of the last century, 'the lands of the out-parish were generally let in small farms for nineteen years, the rents paid in *victuals*, and the labour performed by the tenant and his own family. A few acres adjoining to the house were kept in constant tillage; upon which all the dung of the farm was laid, and the out fields were kept alternately for three years in oats and three years in pasture.' This is the wretched system of infield and outfield, to which we have before referred; but he adds, when the victual rents were abolished, a spirit of industry and improvement began to diffuse itself over the parish. A regular system of inclosing commenced, and all the advantages connected with it.

deservedly a favourite, on account of his superior weight before, and his being deep and level at the *heart-place*, which are points of essential importance for grazing.

The object of the dairy is chiefly pursued on the banks of the Clyde, and much butter and cheese are manufactured which find a ready sale at Paisley, Glasgow, and Edinburgh. Even the higher parts of this district, which elsewhere would be devoted to sheep-feeding, and which ought to be so devoted here, are converted into dairy grounds; and the butter, although not so oily, is equally well flavoured, and scarcely ever becomes rancid. The milch cows are fed on the best pastures during summer, and a few turnips are given in the autumn to protract the milk; but not in sufficient quantity to produce the unpleasant taste of the butter which usually accompanies full turnip-feeding.

Lanarkshire is principally noted for its feeding of calves, which is chiefly carried on in the district of Strathaven, on the borders of Ayrshire. The Lanark or Strathaven veal is supposed to possess a peculiarly delicate flavour, and is much esteemed in the markets of Edinburgh and Glasgow. The calves which are dropped in Ayrshire and Lanarkshire in the winter and the spring are sold to those who attend to this branch of dairy husbandry in Ayrshire and Strathaven. Mr. Aiton ('Survey of Ayrshire,' p. 442) gives the following account of the management of this department of dairy husbandry:—'They are fed on *milk*, which they are taught to drink from a dish; it is given to them by some feeders sparingly at first, to render their appetite more keen, and to prevent them from loathing their food, and as they grow up, the quantity of milk is gradually increased to as much as the calves can be made to drink; but others, with better success, give them a good supply from first to last.' For the first week or two they will not be able to consume more than one-half of a good cow's milk; but when they are coaxed to eat in order to make fat veal, a calf at a month old will consume a cow's milk, and, before it is two months old, it wlll take the greater part of the milk of two cows. The calves that are reared for stock have usually the first drawn milk, and those that are feeding for veal, that which is last drawn from two or three cows; or, if all are fattening for veal, the first milk, provincially named *forebroads*, is given to the younger ones, and that which is last drawn, the *afterings*, to the older ones. Mr. Aiton reprobates the practice of mixing eggs and meal with the milk, from the erroneous notion of their darkening the flesh and web and lights of these animals:—certainly they cannot be needed if plenty of milk is allowed, but of this crime of darkening the carcase they are perfectly innocent.

He very properly adds, that it contains the whole mystery of calf-feeding:—'The only art now used in feeding calves in the vicinity of Strathaven is to give them, after the first two or three weeks, *abundance of milk*, to keep *plenty of dry litter* under them, in a place that is *well aired*, neither too hot nor too cold, and to *exclude the light*, as they are apt to become too sportive when they enjoy much light.'

When the calves become *costive*, a little bacon or mutton-broth will open the bowels, and if they begin to *purge*, a small quantity of *rennet* put into their milk will cure the disease. A lump of *chalk* is usually placed within their reach, and with decided advantage.

The practice of bleeding to expedite their fattening is not approved of; neither are infusions of hay, or oil-cake, or linseed, or any other food beside milk. They are occasionally reared to a most extraordinary size; they have weighed nearly twenty-six stones, exclusive of the offal. An account is on record of one that weighed more than forty stones. After the animal is eight or ten years old, and perhaps is worth from four to six pounds, the continued feeding will seldom be profitable, and the milk may be put to a better use.* Two or three days before the calf is destined to be killed, he is sometimes fed on water gruel, in order to dilute, as it is supposed, his blood, and to give more whiteness to the flesh.

In this manner rich veal is fattened and sent to Glasgow, but principally to Edinburgh, from Christmas to the end of summer, and it sometimes obtains a most exorbitant price.

This is a simple but somewhat expensive method of feeding, and we record it among the peculiarities of certain districts as they pass in review before us. The profit from it is very great. A thriving calf can be purchased, newly dropped, at from 6s. to 8*s.*, and raised on the milk of one cow to the price of 50*s.* or 60*s.* by the time it is four or five weeks old, and to 4*l.*, or more, when it is seven weeks old. If it is kept much longer, the milk of more than one cow must be given to it, and then, at ten weeks old, and in proper season, it will be worth 6*l.* or 7*l.* The Strathaven farmer, therefore, realises a profit of more than 10*s.* per week from a thriving calf, and some have gained as much as 12*s.* or 16*s.* per week. There is one practice of too frequent recurrence in Strathaven, which demands unmingled reprehension. We relate it in the language of Mr. Aiton (p. 99):—'Butchers and others who purchase young calves in the country to carry them to town to be slaughtered, do not in Scotland transport them standing on their feet, as is (sometimes) done in England, but they hang such of them as cannot travel, in pairs by the feet over a horse's back, with their backs and heads hanging downwards; three or four pairs of them on one horse, while the butcher sits upon the top of the group, deaf to their agonizing cries. Others heap as many living calves into a cart, above each other, all tied by the feet, as a horse can draw. It would be worthy of the magistrates of the district to extend their commiseration to these animals, so cruelly and so unnecessarily tortured, and to compel the butchers, or others who deal in that species of stock, to treat them with a proper degree of humanity. A merciful man is merciful even to brutes, and those who practise cruelty towards animals will not long act mercifully towards the human race.†

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* Mr. Aiton illustrates this in his 'Dairy Husbandry,' p. 90. 'Thomas Hamilton of Great Hill, near Strathaven, fed, about the year 1765, a calf to such a degree, that he sold it at the price of 5*l.* The price of veal was not higher at that time than 2½*d.* per lb., which would make the calf more than 34 stones imperial weight.' 'In 1815, Mr. Strang of Shawton, near Strathaven, fed a calf to the weight of 35 stones, and he was offered nearly 16*l.* for it; he refused to sell it at that price, and it soon afterwards sickened and died.' In 1819, Mr. William Granger of Dykehead fatted one to more than 38 stones imperial weight. Mr. Aiton properly remarks, that 'feeding to those weights proceeds, perhaps, more from ostentation than prudence. A calf well fed until it is from four to six weeks old, will (in the neighbourhood of Strathaven) if it is ordinarily thriving, and when the market is not very low, sell at from 4*l.* to 6*l.*; but when a calf is brought to that pitch, the milk may be turned to better account by feeding a young one, than by forcing one already sufficiently fed to a size and weight above nature.'

† We extract from the same author (p. 65) an account of the dairy established by Mr. Harley, at Willowbank, in the neighbourhood of Glasgow, and from which that city is principally supplied with milk. He previously tells us that 'the number of cows in Glasgow and its neighbourhood whose milk is sold sweet to the citizens, may probably amount to two thousand; and as these cows are the very best of the dairy-breed collected from all parts of the country, and are highly fed, both to procure milk and to render them fat; and as they are always sold to the butcher whenever they are fatted, and are replaced by other cows that are lean and newly calved, it may be reasonable to suppose that each cow will yield, on the average, twelve Scotch pints (six gallons) of milk every day.' This seems to be an enormous quantity, and, allowing for occasional deficiency, amounting to about 2000 gallons yearly from each cow. Then, after telling us that 'the feeding is similar to that practised in other towns in Scotland, consisting of grains and

Butter-milk is used to a great extent by the labouring classes in all parts of Scotland, and particularly in the town of Glasgow. The milk of the greater part of the cows that are kept more than two miles, and less than twelve, from Glasgow, is manufactured into sour milk, and used by

draff from the breweries, burnt ale, or other refuse from the distilleries, the refuse of flour usually termed hen's meal, oats and beans; that they have green clover and rye-grass in summer, with the offal of gardens; and turnips and potatoes in the winter, both raw and boiled, with grain, chaff, infusions of hay, &c., but no oil-cake;' he proceeds to describe the extensive dairy of Mr. Harley:—

'Like many other useful establishments, Mr. Harley's dairy proceeded more from accident than original design. It was begun at first on a very limited scale, and has been gradually extended and improved to its present refinement. Mr. Harley, who had been long engaged in manufacturing cotton goods, and who still carries on that branch on an extensive scale, happened to discover in a field, which he had purchased near Glasgow, a copious spring of excellent water. He not only converted that spring to public use by supplying the city better than it had been before, but he erected cold and hot baths, the first and still the only thing of the kind provided for public use in or near that city. Some of the people, who took the benefit of these baths, having expressed a wish to be provided with warm milk after bathing, Mr. Harley procured a cow for that purpose; and as the baths soon became a place of general resort, he not only increased the number of the cows, so as to answer the demand, but perceiving that the city of Glasgow was ill supplied with that valuable article of food, and that much of that which was sold there was of bad quality, he began at first to supply his friends, and afterwards the city, with milk entire as it was drawn from the cow, and in a state of cleanliness formerly unknown in that department of agricultural produce. His byre is formed to hold ninety-six cows, but he has for some time past had about twenty more in out-houses, and purposes to add to the cow-houses.

'The byre having been enlarged at different periods, its external figure is not so complete as it might otherwise have been, but in its internal construction, it is the most perfect of any byre in the kingdom. The cattle are placed in double rows across the building, two rows facing each other, with a road or passage between them, from which both rows are fed, each cow having a grip or groove behind, into which they drop their dung or urine, with a road between it and that of the next row. Stalls for two cows are divided from each other by pillars of cast iron, having grooves, into which the division boards, called trevises, are fixed. Each cow is bound to an upright stake, with an iron chain connected by a turn swivel to a ring round the stake, and which slides up and down as the cow raises or lowers her head; and when the cows are to be fed with potatoes, a pin, suspended from the trevis by a small chain, is put through a hole in the stake, which, by keeping down the ring, prevents the cow from raising her head, and thereby choaking herself with the potatoes. A trough, or crib, is placed before each cow, and, to prevent them from scattering their fodder, a grating of strong wire, suspended on pulleys like the sash of a window, is placed in front of each pair of cows. It is thrown up when food is to be set in, and put down to prevent the straw, &c., being thrown out of the stall to the passage. The grating, while it keeps the fodder from being thrown out of the crib, permits the cow's breath to escape, and does not confine it within the stall, where it would render the food unpalatable, and oblige the cows to breathe in a polluted atmosphere.

'The byre is lighted chiefly from the ceiling, and the windows are constructed so that they can be raised in order to give vent to the bad air, and by opening the doors or windows on the sides of the byre, more or less, according to the state of the weather, the ventilation of the house is so completely commanded, that it can be rendered at all times as cool as the surrounding atmosphere.

'The byre is kept as near as possible at sixty-two degrees on Fahrenheit's scale; and to enable the keeper to do so, a thermometer is placed within the house.

'Besides the roads between the heads of every two rows of cows, and one between the two grips, another runs down the centre of the house, from the one end of it to the other, and all these roads are lain with hewn pavement, and are, with the gratings, division boards, &c., carefully washed every day, and kept as clean as the lobby of a dwelling-house. The whole of the cows are curried and brushed daily, and kept as clean as cavalry horses.

'The bottom of the grips declines a little towards the centre, to lead the water into the common drain, and also towards the cows, so that the urine may run off when the dung is drawn back. The whole urine and washings of the byre, with the juices of the dunghill, that of a public washing-house, connected with the baths &c., are collected into a proper reservoir, and used as manure. The cribs incline towards the centre, where a stone trough is placed, so that by pouring a small quantity of water at the other end, the inhabitants of that city. Mr. Aiton speaks of this with much national feeling, (Dairy Husbandry, p. 111.) 'The butter-milk is, on the authority of the Secretary to the Board of Agriculture (Arthur Young), adjudged to the pigs; but it is in the western counties of Scotland, as well as in Ireland, used to a vast extent as human food. It is used as drink, and is certainly far superior to the miserable table beer generally drunk in England. It serves as *kitchen* to pottage, bread, potatoes, &c.; and when a linen bag, like a pillow slip, is filled with it, and hung up till the serum drops out, and a small quantity of sweet cream is mixed with what remains in the bag, and a little sugar, where the milk is too sour, it forms a dish that might be placed on the table of a peer of the realm.'

The coarse upland on the eastern part of the county is devoted to grazing. The rough pastures there are allowed to grow from the end of May to that of August. The herbage on the better spots is then mown, and the hay stored up for winter food, and the pasture is stocked with young Highland cattle, who live on the grass while the weather continues fine, and to whom some of this bog-hay is given when the storms of winter come on, or the snow is on the ground. If there is no sheltered spot for this purpose, a rude kind of shed is erected, to which they immediately betake themselves. These cattle are sold off in May, and are supposed to have increased 25*s*. or 30*s*. in value. On some farms of this description, many neat cattle are bred: the females are retained to keep up the milking stock, or to sell at two years old; the calves are almost immediately disposed of.

THE SOUTHEAST LOWLANDS.

This district contains the three Lothians, with Roxburgh and Berwick. It is an arable district, and in no part of Scotland has agriculture in all its branches been carried to a greater degree of perfection.

LINLITHGOWSHIRE, OR WEST LOTHIAN.

This county is beautifully situated on the Firth of Forth; its rich land is occupied in pasture, or devoted to the raising of grain. The dairy occu-

the grain sand refuse of food is washed into the trough, and is from thence carried to the piggery.

'The milk is clean, and free from every impurity; it is poured immediately from the milking pails through a hair-sieve into the milk vessel in which it is carried to town.

'The pails into which the cows are milked, and other vessels used, being graduated, and each cow having a running number, the quantity of milk drawn from each, and aggregate of the whole, is ascertained, and regularly entered in a book by the overseer, every time the cows are milked. Part of the milk is sold at the dairy-house near the byres, and part of it is carried through the streets of Glasgow, in large cans fixed on carts, each drawn by a pony.

'A given quantity is put under the charge of the driver, for which he is accountable; and so tenacious is Mr. Harley of supplying the citizens with milk pure and unadulterated, that he puts it out of the power of those who retail it on the streets to introduce water, or any other impurity. When the milk is placed in the cans, they are locked up so close that no air is admitted, except as much as will make the milk run at the cock below; and the air hole is so constructed, that it is not in the power of the driver to introduce water, or any other liquid, by it. The milk-pails, and the whole of the vessels, are well washed and scalded in boiling water every time they are used. The cocks for running off the milk are so constructed, that they can be opened and cleaned in the inside at pleasure.

'Mr. Harley has erected within the byres a very handsome steam-engine, which he uses to raise water to supply the byres, drive a straw-cutter, and a machine for slicing potatoes and turnips, on the principle of that used in cutting logwood. The steam from the boiler is used in steaming potatoes and other food for the cows, in a large vat which the work people term "the cows' tea-pot."'

pies some share of the attention of the farmer; for the proximity of this little district to the northern metropolis affords him an excellent market for the sale of the produce.

The breeds of milch cattle are as various as can be imagined—some Fifes are kept—with many more of the Ayrshire cattle; but with the small farmer, the native breed, still bearing about it much of the Highlander, is either preserved entire, or crossed in every possible way; and crossed with most advantage by the short-horn.

Mr. Dawson, of Bonnylear, informs us that 'the cow,' (*i. e.* the prevailing breed) 'in Linlithgow, is something like the Ayrshire breed.' (It is almost identical with the Roxburgh breed, of which we shall have frequently to speak, when describing these districts.) 'She is small in the head, small and long in the neck, with horns bent round to the centre of the forehead, with a long tail, short small legs, and a straight back; the colour generally black, brown, or a mixture of brown, or a black and white, but the black prevails. The cow will feed to from 28 to 35 stones Dutch. She will give about six imperial gallons of milk per day, and about six or seven pounds of butter per week, for the first two months after calving; after which, the milk will gradually decline, until three months before her calving, when she will become dry.'

We are also indebted to Mr. Dawson, for the following valuable account of the management of cattle in Linlithgow. 'The farmer occasionally preserves a quey-calf of a favourite cow; but in general, the calves, both bulls and queys are sent to the butcher.* The calves that are preserved, are fed on their mother's milk newly drawn for one month, and consuming two-thirds of the milk. The cow generally calves in May, and the calf is put out to good grass in June. In the succeeding winter the calf is put into a covered place, and fed on straw-chaff and the refuse of grain and a few turnips, and turned out to graze in the ensuing spring on the best grass. The bull-calf is castrated when two or three days old, when intended to be reared; and after being grazed and fed in the cart-yard for four seasons, he is disposed of to the butcher, and will weigh from 45 to 55 stones Dutch—he will give from four to six stones of tallow, and his hide will weigh from four to four and a half stones. The Lothian ox is a fine animal, compared with the cow of that district. The difference in the horn is very striking. It is a full-sized middle horn, the head and neck are still small, but the ribs are deep and the legs are short.

'The grazing cattle are chiefly of the West Highland breed, purchased at the great trysts in Falkirk. They are put into a strawyard that is walled round, with a shed or covered place to afford them shelter; and they are supported during the winter on straw and water, with the refuse of the grain. This is what is called watering, and it affords a good supply of dung for the farm. In the spring they are turned out to graze, and if they get into sufficient condition, are sold in the autumn to the butcher, but in many instances they are finished off with turnips.

'Cattle that have been previously well grazed, are likewise bought at these trysts, to consume the better sort of turnips. They are stall-fed from October to February, and are then usually ready for market. They weigh from about 35 to 50 lbs. Dutch, and an acre of turnips will feed two oxen for four months.'

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* Mr. Robertson confirms this; he says, 'The farmers now do not even rear their own milch cows, but purchase them from time to time as required; in some cases every season, so that their dairy is always in full milk, the new cows being purchased newly-calved, and those of the former year put to fatten as soon as they become yell, or dried up in milk, the ample store of succulent food enabling the husbandman so to do.'

The chief attention of the farmer is devoted to grazing, for which the proximity of Linlithgow to Falkirk, the great cattle tryst of the south, and the facilities afforded by the passage-boats at Queen's ferry, for the procuring of lean or store cattle; and also the neighbourhood to the best markets for fat beasts, and, more than all, the excellence of the pasture, are well adapted. The true Highlanders are usually selected, or sometimes the Fifes; but the former fatten most speedily, and the beef is usually preferred. The old inclosed pastures, and the artificial grasses afford abundant provender in the summer, and in the winter too, when the ground is not covered with snow; and there is plenty of straw, hay, and turnips. There are supposed to be about 8500 cattle in the county of all kinds, or about one to every nine acres. Horses have now quite superseded oxen in husbandry work.*

EDINBURGHSHIRE, OR MID LOTHIAN.

This county, although not of great extent, has more variety of climate, soil, and produce, than any other in Scotland. The northern part of it, along the Firth of Forth, is rich and highly cultivated. On the south side of the metropolis, and to the very feet of the Pentland and Moorland hills, and even up the sides of them, there is much ground tolerably productive, at least in good seasons; but on the tops of the hills, and in a great part of the upland district, there are tracts of land which bid defiance to cultivation.

Not more than one-fifth of the arable land of the county is fairly devoted to pasture, and the greater part of that is in the hands of the Edinburgh butchers, whose stock is continually changing, and cannot be said to have any specific character, and which is only halted and preserved upon it rather than fed. Much of the pasture in the occupation of the farmer is devoted to the same purpose, and his profit principally derived from the sums he receives from the occasional, or regular turning out of horses and cattle. The permanent stock, and especially in the neighbourhood of Edinburgh, consists of dairy cattle; and that, as every where else, comprising all kinds of breeds.

The original Lothian breed, about 1765, according to Mr. Robertson, was generally of a black colour, or having a great proportion of black in its composition; though intermixed with white in various proportions and on various parts, as on the flanks, the belly, the shoulders, or not unfrequently in a stripe along the back. They were generally from 22 to 27 stones in weight, when they were fed to a marketable condition; and in order to which, in those days, they were not required to be very fat.†

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* Mr. Gray, in his statistical account of Livingstone, gives a curious description of the old Linlithgow plough. He writes in 1798, 'Not much more than 25 years ago, it was not uncommon to see four horses and four oxen, dragging and staggering before a large heavy plough, with a very small furrow, at the rate of about a mile in an hour, whilst the gadman or driver, the only active being of the cavalcade, was obliged to traverse at least three miles to their one, to prevent them from falling asleep. Now we see no plough drawn by more than two horses, carrying with them a furrow of twice the weight, and going with apparent ease and three times faster; while the horses are of a better breed, in better order, and maintained at a less expense. This and several other improvements in agriculture were introduced by Sir William Cunningham.

† Mr. Robertson (Rural Recollections, p. 165) gives an amusing account of the management of these cattle:—' This species of stock was rather better cared for than that of the horses. They were peculiarly under the gudewife's management, who with her maid took care that the milch cows should not be neglected in their *sodden meat*, which consisted in a *hotch-potch* of small potatoes, weak corn, with cabbage and greens, all boiled up in a mass among bean-chaff, in a large cauldron for the purpose in an outhouse; as also, in separate masses the *kavings* or rakings from the barn-floor, and the

The Ayrshire, however, which was scarcely introduced in 1820, has gradually prevailed; but the English short-horn is kept by many who naturally look for profit in the quantity, and not the quality of the milk in a metropolitan dairy; and, of late, the Roxburgh cow has been much used in dairy establishments, on account both of the quantity and the quality of its milk. It is a cross between the short-horned bull, and the Kyloe cows, and comprising the good qualities of both.

Mr. Brown, however, the present intelligent manager of the Caledonian dairy at Meadow-bank, in the suburbs of Edinburgh, prefers the Ayrshire. In a communication with which he has kindly favoured us, he draws the following comparison between the Ayrshire and the Teeswater cow. 'I would prefer the Ayrshire: take them in general, they give as much milk as the Teeswaters, and can be purchased at a much less price. A Teeswater cow will, at the present time, cost from 12*l.* to 16*l.*, whereas an Ayrshire cow will cost from 9*l.* to 12*l.* The Teeswater cow, after standing long in the dairy, will occasionally fail in her feet, and she will then cease to feed, and become a total wreck, especially if she is old. The Ayrshire being smaller, is not so heavy on her feet, and although only half fat, may be sold to better advantage and with less loss, if she too should begin to feed badly, from tenderness in her feet, or any other cause.'*

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shortest or best of the straw, together with the bladings of the greens in their raw state from the kail-yard, and then (as alleged) rips of corn drawn hiddling-wise from the stacks in the barn-yard, especially to the new-calved cows, or any stray stuff that bore a semblance of going otherwise to unuse. The herd boy, too, was enjoined to let the cows get, aye, the most choice patches of grass in preference to the horse, among the balks and waste grounds that abounded so much in those times on almost every farm. This anxiety in the gudewife for the welfare of her cows was generally connived at by the gudeman, who failed not to observe any little pilferings of the kind, as he knew it would be all very thriftily applied.'

* The Caledonian Joint-Stock Dairy Company was established in 1825, for the purpose of supplying the inhabitants of Edinburgh with pure milk. The grounds called Meadow-bank, situated about a mile from Edinburgh on the London road, and also some other property named Wheatfield, were purchased at the expense of 8000*l.*; and 14,000*l.* more was expended in the erection of a noble building. In the front of the edifice is a semi-circular projection, in the centre of which is the principal entrance, having a column on either side supporting a handsome pediment. The interior of this projection contains a saloon corresponding with it in form, and through which the visiter passes into the Great Byre. This is a noble place, and is supported by two rows of cast-metal pillars. The stalls are divided by the same material, and are capable of containing 200 cows under one roof. It is 30 feet high, and from the centre of it rises a large dome, for the purpose of light and ventilation. It is also lighted, and air admitted at both ends, and on one of the sides. From a gallery over the principal door, the visiter has a pleasing view of the whole.

The troughs are of stone, and each is supplied with a pipe; by means of which it can be readily cleansed, or water admitted for the common drink of the animals.

Arched vaults extend below, through the whole length of the byre. The urine readily passes, and the dung is conveyed without difficulty into these vaults, whence they are removed through a tunnel that opens on the main road.

Over the saloon is a room for the Directors, and one above that for servants. The other part of the building, parallel with the byre, contains the manager's house, counting-house, milk-house, churning-house, engine-house to churn the milk, store-houses for potatoes, lofts for hay, a steaming-house to prepare food for the cows, stables for the horses, a shed for a bull, and everything that can be wanted in such a place. The ground next to the road, and in front of the building, is tastefully laid out as a shrubbery; and there is an ice well to prepare the cream.

Like many other speculations of the kind, it did not answer. There were never more than 160 or 170 cows in the byre; these rapidly diminished in number, until the concern was so plainly a losing one, that it was abandoned by the company, and let to a spirited individual, (Mr. Bellis,) by whom it is still conducted, and who has 60 or 80 cows in the byre.

For much of this information, and also on many a subject connected with our work, we are indebted to our kind friend, Mr. Dick of Edinburgh.

Little butter, and still less cheese is made in such a district, the greatest profit arising from the sale of the fresh milk.*

Except, however, in the neighbourhood of Edinburgh, there are fewer milch cows kept in all the Lothians, than there were before a portion of the wild lands on the west and the south was brought under cultivation. The crops of an arable farm are most easily disposed of, and more profitably in the vicinity of a great city.

The Lothian farmers rarely breed their own dairy cattle, but purchase them from time to time as some of their stock become dry, or in condition for the butcher. Some dairy men thus change the greater part of their stock every year; those of the former year being put to fatten as soon as their milk is dried away, and thus, as we have stated when describing West Lothian, their dairy is always full of milk, for the new cows have only recently calved. Edinburgh is supplied with sweet milk by cow-keepers in the neighbourhood, or large dairies; two of which are established in the outskirts of the town. The butter-milk, or *sour* milk, is brought from a greater distance.

A few cattle are bred among the hills, and more are grazed, principally winter grazing. These are chiefly of the West Highland breed. There are many tracts of ground sufficiently sheltered, where they may run during the winter, and on which sheep cannot safely be turned, while other still wetter portions of the moorlands produce plenty of hay—coarse enough—but which the stock readily eat during the winter months.

Mr. Brown has given us some valuable hints as to the management of these cows. He prefers the fresh draff or grains from a strong ale brewery, to any other feeding for the production of milk and of a good quality. He gives them two feeds of this (half a bushel constituting a feed) twice every day, and also two feeds of grass or turnips. When green beans, or peas, or tares, are to be obtained at a moderate price, they are preferred, as imparting a richer quality to the milk than the grass will do. A certain quantity of salt is given at every meal to promote the digestion of the food, and preserve the health of the animal, and produce a degree of thirst that will make them eager to drink, and thus yield more milk. He considers the draff from table beer or draught ale as of a very inferior quality, and producing a less quantity of milk and of a very inferior kind.

The sproutings (*cummins*) of malt furnish a valuable article of drink. He puts two bushels into a large tub, and adds as much boiling water as will fairly draw it as tea. He covers it up close for seven or eight hours, and then adds hot or cold water, as may be required, so that the infusion may be given to the cows comfortably warm, having previously put in a very considerable quantity of salt. The tea from these two bushels will be as much as 70 or 80 cows will drink at one time, and he commonly gives it to them twice every day, before they are fed with the draff.

At the commencement of the turnip season, and when the turnips are juicy and green, he gives less of the *cummins* to drink, or has recourse to distillers' draff, in order to prevent the milk from being too much lowered in quality. Potatoes likewise make a very useful drink, when boiled until they are dissolved through the water. Two bushels of potatoes may be thus mixed with sufficient water to satisfy 70 cows, and they will very considerably enrich the milk, when given with salt before the draff. Steamed potatoes he seldom uses for the milch cows; they fatten well, but they do not produce so much milk as raw potatoes. Sometimes, when the turnips are fresh and juicy, he gives one feed of them, and one of steamed potatoes, with the usual feeds of draff. Steamed potatoes, with which a little bruised or ground grain is mixed, have been very useful in preparing the dried cows for the butcher.

* The Costorphine cream used to be in high repute in Edinburgh and the neighbouring country. The process, as extracted from the statistical account of the parish of Costorphine, is very simple. 'They put the milk when first drawn into a barrel or wooden vessel, which is submitted to a certain degree of heat, generally by immersion in warm water; this accelerates the separation of the oleaginous from the serous parts of the milk. The milk is then drawn off by a hole in the lower part of the vessel, what remains is put into the plunge-churn, and, after being agitated some time, is sent to market as Costorphine cream.'

HADDINGTON, OR EAST LOTHIAN.

This highly cultivated district lies partly on the Firth of Forth, and partly on the North Sea. On the sea-coast the system of grazing is pursued, but not to a considerable extent; the central parts are mostly arable; and the hills of Lammermuir are devoted to sheep husbandry, or to the breeding of a few Highland cattle. The old cattle were of a black or dark-brown colour, with a thick hide of hair, handsome and hardy, but not yielding much milk. A few of them are stall bred, and more are grazed on the natural pastures of Lammermuir, where sheep would not be safe.

East Lothian cannot be called a breeding country, and there are few of the farmers who breed cattle as a regular branch of their husbandry. The great bulk of the cattle are bought at Falkirk, in September and October, and selected not from any particular breed, but according to the fancy of the purchaser. They are mostly Aberdeens, Angus, or Fife cattle, with a few Highlanders, which are put into the yard immediately on getting home, and are fed in the beginning of winter on white turnips, and afterwards on Swedes. They are rarely tied up, but feed in the yard. The reasons assigned for this are, that the skin and the feet are in a better state to bear the journey to the market; and that the same number of cattle can rot a greater quantity of straw. Mr. Rennie, to whom we are indebted for much useful information, tells us, that he has from 700 to 1300 bullocks feeding during the winter, and that he always prefers the short horns when he can get them well bred.

The dairy cows, until within a few years, were so various in their form and quality, that it was difficult to trace their ancestry with anything like precision; yet there were among them many very excellent milkers. Mr. George Rennie, of Fantassie, had a cow, that, during one week, yielded 22 Scotch pints (11 gallons daily), from which were produced 22 pounds 10 ounces avoirdupois of butter.

They were chiefly a cross of the Holderness with the native breed, but they have yielded in a great measure to the Fifeshire and the Ayrshire breeds, which, with an increasing number of tolerably pure short-horns, divide the county among them.

In the neighbourhood of Ormiston there used to be a mixture of the Holderness with the native cattle. They were short-horned and handsome, they fattened well, and gave much milk. Five or six gallons of milk daily was no uncommon produce.

We have been honoured with a letter from Mr. John Rennie on the subject of his stock, from which we make the following extract, confirmatory of Mr. Brown's account, and which, in justice to so enterprising and skilful a breeder as Mr. Rennie, should be placed upon record. 'The principal breed (he means among the few who have directed their attention to the breeding of cattle) is short horns, or Teeswaters, which were introduced by myself; having selected them from Mr. Robertson, of Lady-kirk, who, I have no hesitation in saying, had some of the best short-horns in the kingdom. I also had two or three bulls of the best blood from the county of Durham. I had three or four large sales of stock, which were attended by some of the most celebrated breeders in England and Scotland. Bulls were bought at from 50*l.* to 120*l.* each, to go 200 miles north, and above 300 miles south.'

Mr. Brown, of Drylaw-hill, to whom we are indebted for some previous remarks, informs us, that about the year 1818 and 1819, the short-horned, or Teeswater breed of the best and purest sort, was introduced into the county principally from the stock of the late Mr. Robertson, of Lady-kirk, and which were descended in a direct line from those of Messrs. Colling, of Darlington. Others were likewise brought from some of the most celebrated stocks in the north of England. For this, he says, the county was indebted to Mr. John Rennie, son of Mr. George Rennie. The produce of his stock is now spread over the county; and as a proof of its merit, a bullock, bred by Mr. Rennie, and fed by Mr. Boyne, of Woodhall, received the second prize at the Smithfield Cattle Show, in 1831.

Mr. Rennie obtained many prizes from the Highland and his own district Society. He has had many beasts that weighed from 80 to 100 stones (imperial weight) when at 2½ or 3 years old; and he once sold 18 steers, at 2½ years old, which weighed from 85 to 100 stones, and for which he received 33*l.* per head.

The spirited exertions of Mr. Rennie have not been followed up by others as they should have been, partly from disinclination to move out of the old track, but more from the badness of the times.

Some agriculturists, however, began to direct their attention to the crossing of the short-horn bull with some of the Scottish breeds, such as the West Highland and Ayrshire cows, and confining themselves to one cross. In this way they have produced some very fine animals, possessing many of the best qualities of both breeds, and particularly combining the early maturity, aptitude to fatten, and beautiful form of the sire, with the fine beef and hardy constitution of the dam. A few went beyond the first cross, and the best qualities of both breeds were lost.

ROXBURGHSHIRE.

The cattle of this district are much changed since Dr. Douglas wrote his 'Survey of Roxburghshire' in 1798. He says, that 'if there ever was a breed of black cattle peculiar to this county it cannot now be distinguished. For several years a number of the Northumberland, Lancashire, Galloway kinds, a few of the Dutch and Guernsey, and many from the northern counties of Scotland, have been brought into Roxburghshire, and their offspring, from various crosses with each other, forms the principal part of its present motley stock.'—P. 144.

Now, except with the small farmer, and it is the same with him everywhere, there are few counties in which the breed is so distinct. He acknowledges that two kinds were beginning to obtain a preference: 'one of them, the polled or Galloway kind, whose properties are well known over all the island; and the other (to which he does not give a name) with small horns of a middling length, thin necks, round deep bodies, and short legs.'

This nameless breed, which was indeed the Ayrshire, beginning to assert its superiority over the other cattle of the south of Scotland, by degrees drove before it the polled breed and all the crosses and became the prevailing stock in Roxburghshire. Within the last ten or twelve years, however, a second revolution has been commencing. The short-horns, zealously cultivated on the English portion of the south of the Tweed, have been finding their way in increased numbers across the borders, and disputing the palm with the Ayrshire, and threatening to beat them out of the field. The last cattle-show at Kelso (1832) will complete the victory, for while thirty short-horned bulls competed for the prize, only two Ayrshire heifers were produced.

The rich soil of a considerable part of Roxburghshire, and of the south of Scotland generally, may support this large and excellent breed; but even in the southern counties there is no inconsiderable portion of inferior land, and in the northern counties there is a great deal of it, and it may be worth while to consider how far it may be prudent so decidedly to encourage a race of cattle, that must be restricted to comparatively favoured districts and localities. With all their pre-eminent qualities, and we shall do them full justice in the proper place, they have already been tried in the middle and the north of Scotland, and have failed.

The greater part of the rich pastures of Roxburghshire are devoted to sheep, yet there are many cattle. In the neighbourhood of Kelso, and extending thence to Jedburgh, much veal is fatted. Dr. Douglas says, that 620 calves are killed by the butchers in Kelso alone, and 1400 in Jedburgh and the other inferior markets. To fatten 2000 calves, and to rear as many more for after-sale, or to keep up the stock, will require more than an equal number of cows, so that in this district there is little cheese made, and no more butter than is sufficient for the consumption of the inhabitants.

Towards the middle and south of the county there is much fine pasture, on which a great many cattle, bought at the northern trysts, or from Northumberland, are grazed during the summer, or stall-fed in the winter.

Dr. Douglas computes the turnip-fed cattle at 6000, and those that are grass-fed at the same number.

Very few oxen are employed in husbandry.

BERWICKSHIRE.

This county has well been called the cradle of Scottish agriculture. Here some of the most important improvements in husbandry generally, and particularly in the breeding and management of cattle, commenced; and although the march of improvement has been rapid elsewhere, some parts of Berwick are not inferior to the most highly cultivated districts of the south of Scotland.

So late as the year 1772, one of the parishes was described as possessing all the peculiarities of bad husbandry to which we have so often alluded in our sketch of the cattle husbandry of Scotland. 'The country was almost totally uninclosed, and let out into small farms; an inconsiderable part only of each could be kept in condition for tillage. The *croft* part had all the little manure, the out-field was partly cropped with oats, without any kind of manure, and partly allowed to lie waste, pastured by some half-starved cattle. When that which was cropped was quite exhausted, it was allowed to rest, and a portion of the other waste ground was taken up in its place; and the whole face of the country exhibited marks of extreme indigence.*' This was a faithful picture of Berwickshire; but now, by the introduction of turnip-husbandry, and a more scientific attention to the rearing and feeding of cattle, a great part of it has been converted from a bleak and neglected district into a beautiful and well-cultivated country.

Among the earlier labourers in the work of improvement may be reckoned Mr. Pringle, of Coldstream, who, in 1755, began to cultivate turnips in drills. About the year 1770 Mr. Robert Hogarth, of Corpse, on the property of the Marquess of Tweeddale, took up the culture of the turnip and of sown grasses. Mr. Brodie, of Ledgert Wood, speedily followed, and many spirited improvers were soon found in the Merse, or lower part of the country.

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* In consequence of a drought, which continued during the whole summer of 1766, two-thirds of the cattle at Lauder, in this county, were slaughtered at Martinmas, and sold at 2¾*d.* per pound. Many of those that remained died at the stall in the following spring, after having consumed all the straw that remained.

The parish of Gordon, in Berwickshire, affords a singular illustration of the rapid progress of turnip husbandry. In 1775 there were only eleven beasts fed with turnips for the butcher; in 1781, an interval of only six years, there were 200, beside a great many sheep.

This increase of more nutritious food for cattle necessarily led to the introduction of a better stock. It is difficult to say what was the native stock of cattle in Berwickshire. They were small and ill formed, especially on the high moors which occupy the north of the country, but they were essentially of the Highland breed. In the lower parts of the country they were of larger size, and crossed in every possible way. They were hardy, kindly feeders, especially when moved to richer pasture than the place of their birth produced, or than was allotted to them there. In the drier turnip-soiled part of the country, a somewhat larger breed could be maintained; and the natives were crossed by the Teeswaters, and a half-bred and improved stock was the result. This differs little from the Roxburgh cattle already described; but some of the richer pastures, and especially the vale of Merse, could support yet heavier cattle, and the pure improved short-horn was established there. Mr. Robertson (Rural Recollections, p. 369) thus describes the progress which Mr. Hogarth had made: 'He had the finest *hirsel* of beautiful cattle, of his own rearing, that I have seen in any one breeder's possession. On one occasion I counted 136, full grown, pasturing in one field on the Carfrae farm, of an elegant form, and fine brindled brown and white colour.'

Among the better kind of farmers, and where the ground will bear them, the Teeswater is the favourite breed; but by them it is often very capriciously, sometimes injuriously, and at other times advantageously crossed. The smaller farmers have more of the half-bred, likewise strangely mingled; for many of the calves are bought of their servants, or at some fair, almost without reference to the breed, and reared for the dairy.

Grazing is carried to a considerable extent in the low country, where there is plenty of hay and turnips. Some short-horns are raised to a great size; and a great many Highlanders are bought for winter-grazing, or to consume the straw and inferior turnips in winter, and be prepared for sale by grass in the spring and summer.

Mr. Kerr, in his excellent Survey of this County, published in 1809, says, that 'there are few regular grazing farms in Berwickshire, but the pastures are variously stocked with mixed feeding beasts, or young cattle, or sheep of various ages, or young horses, or all mixed together. These are occasionally going off to market, or taken home to the particular farms, as the home pastures become thinned of stock, or when the latter-math of the hay-fields are ready for pasturing; and their places are supplied by draughts from the farms, by weaned lambs or calves, or by purchase from different markets for feeding, or for carrying on to feed in winter upon turnips; or these fields are occupied by the still more miscellaneous and continually changing stock of butchers or jobbers, serving as receiving fields for their constant purchases, until the demand at market enables them to kill or sell to advantage.'—p. 326.

'No regular dairy grounds are to be found in Berwickshire. Any little dairy there is, is entirely confined to such quantity of milk as can be spared from rearing the regular yearly supply of young stock on each farm, or rather after the calves are reared. This serves to supply each family with milk, butter, and cheese, and sometimes leaves a small superfluity, chiefly of butter, for sale. The wives of the married ploughmen and herds, who have always one cow each, make their little dairies an object of particular attention, and by them chiefly the few contiguous markets within their reach are supplied.'*—p. 327.

The winter food differs with the different kinds of stock. The cows in calf, and those giving milk, are fed on white straw, with a few turnips. Young cattle that are only carrying forward in the three first years are treated in the same manner by farmers that have few turnips; but where this valuable root can be spared, the younglings have a more liberal allowance, and which is amply repaid by their manure and increase of size. Hay is rarely allowed to the cattle stock, except to early calving cows a little while before calving, or to other cattle when turnips fail before the spring-grass comes in. Oil cake is not much used, except for carrying on some favourite to a great size. Soiling cattle is getting more into practice.

THE SOUTH-WESTERN LOWLANDS.

These contain Selkirk, Dumfries, Kirkcudbright, and Wigtown.

SELKIRK.

More than five-sixths of this little and thinly-populated county is devoted to sheep pasture, and consequently, neither the rearing nor the fattening of cattle is an object of much attention to the Selkirk farmer; but, as on most of the sheep pastures there is a considerable quantity of coarse grass which the sheep will not touch, the agriculturist is compelled to keep a certain number of cattle, either to eat it down in the field, or to consume it when made into hay. Dr. Douglas, in his 'Survey of Selkirk' in 1798, calculated that about 2200 black cattle were kept in the whole county, while the number of sheep were 118,000; but since the draining of so great a proportion of the bog-land, the succulent grass has increased so much, that a mixture of cattle with the sheep is indispensable on every recovered and drained pasture. Mr. Hogg calculates that there are now 3000 head of dairy cattle, besides a great number of the Highland breed which are grazed on the sheep grounds.

The middle division of Selkirk is said to have been first occupied as a sheep country by James IV., in 1503; but the old prejudices in favour of black cattle remained in the other districts for more than two centuries afterwards, and the Ettrick Shepherd (in his short but interesting account of the 'Statistics of Selkirkshire,' published in the 18th number of the Quarterly Journal of Agriculture) says, 'in all the high-lying grassy farms, the occupiers had shielings for the summer tending of cattle, of which there are unequivocal marks in every glen. You have the mark of the little bothy or shieling there, the small round fold for the calves, the larger one for the cows, and the little milking bught for the cross camstray ones. There you have the long raggled fence between the high and the low grounds, or between the summer and winter grazing. Within this all their arable land was contained, spread in patches here and there over an immense surface; and within this fence the cattle were not admitted until the harvest was over.'

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* Mr. Aiton, in his 'Treatise on Dairy Husbandry,' p. 5, has some valuable remarks on this too-neglected branch of agriculture. 'In a large store farm in the Lammermuir, Annandale, or in any other of the southern or eastern districts of Scotland, fifty, one hundred, perhaps several hundred, acres of land, much of it lying in a state of complete waste, overrun with brambles, heath, and rushes, or burns, or streams of water at times running over and wasting the best of it, might, by proper industry, be converted into excellent dairy-ground, and rendered productive of much grain, roots, and hay, without doing great injury to the sheep walks. Part of it could be appropriated every winter to the feeding of the young or weak of the sheep flock; and, when the hill-pasture was buried under snow, the sheep would often find relief on the low and cultivated lands, or be supported on the hay, turnips, &c. raised thereon, and stirred up for their use in winter. Some of the store-masters argue, that the rich grass on such land would induce disease on the sheep-stock; yet, when deep snow lies long, they drive their sheep many miles to come at similar pasture. The range of sheep-pasture would, no doubt, be a little narrowed by taking off the lowest lands for dairy-ground, but is nothing to be reckoned upon 10, 15, or 20 milch cows, and a considerable portion of good grain in early ordinary seasons.'

Mr. Hogg, in a private communication, with which he kindly favoured us, says that 'in his early remembrance, the cattle of Ettrick Forest (another name for Selkirkshire, or for that part of it which includes the two pastoral rivers, the Ettrick and the Yarrow, with all their tributary streams, and the land around them) were all of one breed, a sort of cross made réd, or red and white breed, and rather a hardy and useful breed; but now the short-horns, or the Ayrshires, or a cross between the two, have almost totally superseded them. The short-horns are becoming more and more the favourites, yet for domestic purposes it may be doubtful whether they excel either the old breed or the Ayrshire cross.

'The premiums for cattle, given by the pastoral society of Selkirkshire, are all for the short horned breed, snd therefore the principal farmers cherish that breed; but the cattle of the smaller farmers and the cottagers are nearly all of the Ayrshire, or of the cross of which I have spoken, and which is really the best for domestic purposes, producing more milk and butter, proportioned to the weight of the carcass, than any other breed or cross in Scotland.'

Mr. Hogg deserves much praise for his zeal in improving the forest breed of cattle. The late Mr. Milne brought a fine short-horn bull-calf from Northumberland, which proved so fine a beast, that he was anxious to retain his produce as much as he could to himself. Mr. Hogg, however, obtained a calf of his getting, which proved as fine an animal as his sire, the use of which he permitted to all his neighbours, and by means of which he effected a change in the breed of the whole district. He thus describes them: 'They are of the short-horned breed, with horns white to the top, and the prevailing colour white; but the breed is rather small, weighing when fat 60 or 70 stones. The quantity of milk they give is not large, but rich in butter.'

Speaking of the management of cattle in Selkirk, he says, that 'There is generally, over Selkirkshire, a boundary between the sheep and cattle pastures, over which the cows are not allowed to range. It is always an article in the Duke of Buccleugh's leases, that no cattle shall be allowed to graze on the sheep pasture: nevertheless, many farmers, both of his, and of all the other proprietors, graze young cattle, and Highland cattle on their mountain pastures, wherever the farms are rough, coarse, and spritty, for the cattle eat all the coarser grasses which the sheep have left. The fact is, that on many of our forest and Eskdale farms, the more cattle they keep from May to September, the more sheep they can keep; as the former eat all the large, rich and succulent grasses, which, unless they were mown, would lodge and perish. These Highland and young cattle sometimes graze in the fields the greater part of the winter, but go into the sheds and are foddered at night, and when fodder is plentiful, and manure is wanted, they are fed in the sheds during the whole of the winter.'

The calves are fed three times in the day, and get two quarts at each meal for three months; after that, the farmers' wives begin to 'take a stoup out o' their bicker,' as they term it, giving them less and less with a little skimmed milk, until they are weaned. After this, the calves are generally turned out into coarse pasture. The fattening cattle are fed solely on grass in the summer, and on hay, straw and turnips in the winter. The shepherds' cows are fed solely on bog-hay during the winter, and graze with the sheep all the summer.

In his Statistical Account of this county, Mr. Hogg speaks of Lord Napier, as having done much to improve the Selkirk cattle, and especially by having established a pastoral society for the improvement of the breed of all kinds of live stock; the effects of which, in a local point of view, have been as beneficial as those of the Highland Society in a general one.

Having now treated of all the different breeds of the middle horns, we must, in order to complete our description of the Scottish cattle, commence a new chapter.

CHAPTER IV.

THE POLLED CATTLE.

We have already stated that there appear to be the remnants of two distinct breeds of aboriginal cattle in the parks of Chillingham in Northumberland, and Chatelherault in Lanarkshire; the first are middle horns, and the second are polled. The continuation of the first we have evidently traced in the Devon, the Hereford, the Sussex, and the Highland cattle; the others would appear to survive in the Galloways, the Angus humlies, the Suffolks and the Norfolks. How far this may be correct will appear as we take a rapid survey of these districts.

GALLOWAY.

The stewartry of Kirkcudbright and the shire of Wigton, with a part of Ayrshire and Dumfries, formed the ancient province or kingdom of Galloway. The two first counties possess much interest with us as the native district of a breed of *polled*, or *dodded*, or * *humble* cattle, highly valued in some of the southern Scottish counties, and in almost every part of England, for its grazing properties. So late as the middle of the last century the greater part of the Galloway cattle were horned—they were middle-horns: but some of them were polled—they were either remnants of the native breed, or the characteristic of the aboriginal cattle would be occasionally displayed although many a generation had passed.

For more than 150 years the surplus cattle of Galloway had been sent far into England, and principally to the counties of Norfolk and Suffolk.†

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* Dr. Johnson gives a curious derivation of the term humble. He says of their black cattle, (Journey to the Western Isles, p. 186.) 'Some are without horns, called by the Scots *humble* cows, as we call a bee a *humble* bee that wants a sting.'

† In 1663 the Rev. Andrew Symson was appointed minister of the parish of Kirkinner, in the county of Wigton; and in 1682 he published a work, entitled 'A large Description of Galloway.' The manuscript was accidentally found in the Library of the Faculty of Advocates in Edinburgh, and was published by a gentleman connected with Galloway. It is

The polled beasts were always favourites with the English farmers; they fattened as kindly as the others, they attained a larger size, their flesh lost none of its firmness of grain, and they exhibited no trace of the wildness and dangerous ferocity which were sometimes serious objections to the Highland breed. Thence it happened that, in process of time, the horned breed decreased, and was at length quite superseded by the polled; except that, now and then, to show the uncertainty of the derivation of the breed, a few of the Galloways would have diminutive horns, but these were of a very curious nature, for they were attached to the skin and not to the skull.

The agriculture of Galloway, like that of every part of Scotland, was in a sadly deplorable state until about 1786, when the Earl of Selkirk became desirous of effecting some improvement in the management of his estates both in the shire and the stewartry. He was however too far advanced in life to engage personally in the business, and he delegated the whole management of his property to one of his sons, Lord Daer.

This young nobleman entered enthusiastically into the views of his father, and although he encountered much opposition, and many a difficulty, from the ignorance and prejudice of the tenantry, he was beginning to possess the satisfaction of witnessing the accomplishment of several of his projects, when he was carried off by consumption at the age of thirty. His plans, however, were adopted and zealously pursued by his brother, who succeeded to the earldom, and Galloway owes much of its present prosperity to these liberal and patriotic noblemen.

In addition to the Selkirk family, we may reckon among the most zealous and successful improvers of the breed of Galloway cattle, the Murrays

now o t of print. The following extracts from it will be interesting, as exhibiting the state of the breed and management of cattle in Galloway at that period. 'The north parts of the countrey are hilly and mountainous; the southern parts more level and containing much arable land. The soil is thin and gravelly, but towards the sea it is deeper. The snow uses to melt shortly after it falls, unless it be accompanied by violent frosts. The products are bestiall, small horses, sheep, wool, white wollen, bier (barley,) oats and hay; as for wheat, there is very little. The bestiall are vented in England, the sheep at Edinburgh, the wool at Ayr and Glasgow and Stirling, and the horses and woolen cloath at the faires.

'In this parish of Kirkinner, Sir David Dunbar of Baldone (*a*) hath a park, about two miles and an halfe in length, and a mile and an halfe in breadth, the greatest part whereof is rich and deep valley ground, and yeelds excellent grass. This park can keep in winter and in summer about a thousand bestiall, part whereof he buys from the countrey and grazeth there all winter; other part whereof is of his owne breed, for he hath neer two hundred milch kine, which for the most have calves yearly. He buys also in the summer time from the countrey many bestial, oxen for the most part, which he keeps till August or September; so that yearly he either sells at home to drovers, or sends to St. Faiths, Satch, and other faires in England, about eighteen or twentie scores of the four year olds; those of his owne breed are very large, and may bring five or six pounds sterling apeece. Those of his own breed are very large, yea, so large, that in August, 1682, nine and fifty of that sort were seized upon in England for Irish (*b*) cattell, and because the person to whom they were entrusted had not witnesses there ready at the time to swear that they were seen calved in Scotland, (although he offered to depone that he lived within a mile of the park where they were calved and reared,) they were, by the sentence of Sir. J. L—— and some others, knocked on the head and killed: a very hard measure, and an act unworthy persons of that quality and station.

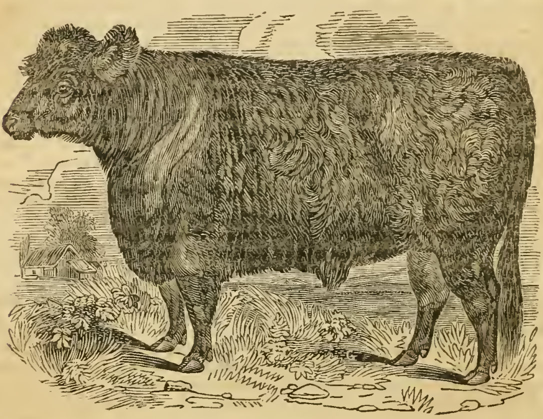
'I can say that the park of Baldone is the chiefe, yea, I may say, the first, and, as it were, the mother of all the rest, Sir David Dunbar being the first man that brought parks to be in request in this countrey; but now many others, finding the great benefit thereof, have followed his example, as the Earl of Galloway, Sir William Maxwell, Sir Godfrey M'Culloch, Sir James Dalrymple, and many others, who have now their parks and enclosed grounds.'

(*a*) The ancestor of the Earl of Selkirk's family.

(*b*) At this period the importation of black cattle from Ireland was prohibited.

of Broughton, the Herons of Kirronchtrie, the Gordons of Greenlaw, the Maxwells of Munches, and the Maitlands in the valley of Tarff in Kirkcudbright; and in Wigton, the Earls of Galloway, the Maxwells of Mouneith, the M'Dowals of Logan, the Cathcarts of Genoch, the Hathorns of Castle-Wig, and the Stewarts of Phygell.

For much of the description of the Galloway beast, and for the greater part of our account of the management of the cattle in that district, we are indebted to an old and skilful and well-known breeder, whose name we regret that we are enjoined to withhold; but he will accept our thanks, and at some future period, possibly, the public will know to whom we and they are much indebted.



[*Lean Galloway Ox.*]

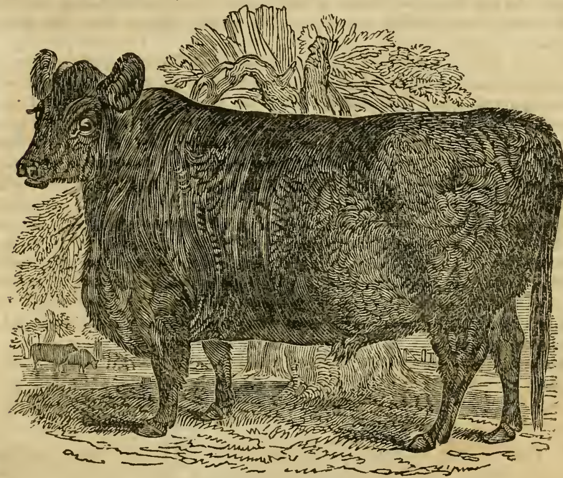
This cut is the portrait of a lean Galloway ox which gained the Highland Society's prize in 1821. It was bred by Mr. Mure of Grange, near Kirkcudbright, (we wish that we were permitted to acknowledge all our obligations to this gentleman,) and belonged to James Bell, Esq. of Woodford Lees.

The Galloway cattle are straight and broad in the back, and nearly level from the head to the rump. They are round in the ribs, and also between the shoulders and the ribs, and the ribs and the loins. They are broad in the loin without any large projecting hook bones. In roundness of barrel and fulness of ribs they will compare with any breed, and also in the proportion which the loins bear to the hook bones, or protuberances of the ribs. The Rev. Mr. Smith, the author of the Survey of Galloway, says that, 'when viewed from above, the whole body appears beautifully rounded like the longitudinal section of a roller.' They are long in the quarters and ribs, and deep in the chest, but not broad in the twist. The slightest inspection will show that there is less space between the hook or hip bones and the ribs than in most other breeds, a consideration of much importance, for the advantage of length of carcass consists in the animal being well ribbed home, or as little space as possible lost in the flank.

The Galloway is short in the leg, and moderately fine in the shank bones, —the happy medium seems to be preserved in the leg, which secures hardihood and a disposition to fatten. With the same cleanness and shortness of shank, there is no breed so large and muscular above the knee, while there is more room for the deep, broad and capacious chest. He is clean, not fine and slender, but well proportioned in the neck and chaps; a thin and delicate neck would not correspond with the broad shoulders, deep chest, and close compact form of the breed. The neck of the Galloway bull is thick almost to a fault. The head is rather heavy; the eyes are not prominent, and the ears are large, rough, and full of long hairs on the inside.

The Galloway is covered with a loose mellow skin of medium thickness, and which is clothed with long, soft, silky hair. The skin is thinner than that of the Leicestershire, but not so fine as the hide of the improved Durham breed, but it handles soft and kindly. Even on the moorland farms, where the cattle, during the greater part of the year, are fed on the scantiest fare, it is remarkable how little their hides indicate the privations they endure.

The prevailing and the fashionable colour is black—a few are of a dark brindled brown, and still fewer are speckled with white spots, and some of them are of a dun or drab colour perhaps acquired from a cross with the Suffolk breed of cattle. Dark colours are uniformly preferred, from the belief that they indicate hardness of constitution.*



[*The Galloway Ox in good condition.*]

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* Mr. Culley, who is great authority in these cases, thus describes the Galloways: 'In most respects, except wanting horns, these cattle resemble the long-horns both in colour and shape, only they are shorter in their form, which probably makes them weigh less. Their hides seem to be a medium between the long and the short horns; not so thick as the former, nor so thin as the latter; and, like the best feeding kind of long-horns, they lay their fat upon the most valuable parts, and their beef is well marbled or mixed with fat. They are mostly bred upon the moors or hilly country in Galloway, until rising four or five years old, when they are taken to the fairs in Norfolk and Suffolk previous to the turnip

This cut represents the Galloway bullock almost ready for the butcher. The beautifully level laying on of the flesh and fat will not escape the notice of the reader.

The breeding of cattle has been, from time almost immemorial, the principal object of pursuit with the Galloway farmer; indeed it is calculated that more than thirty thousand beasts are sent to the south every year. The soil and face of the country are admirably adapted for this. The soil, although rich, is dry, nnd healthy, particularly in the lower districts, the substratum being either gravel or schistus rock. There are many large tracts of old grass land, that have not been ploughed during any one's recollection, and which still maintain their superior fertility; while the finer pastures are thickly covered with natural white clover, and other valuable grasses. The surface of the ground is irregular, sometimes rising into small globular hills, and at other times into abrupt banks, and thus forming small fertile glens, and producing shelter for the cattle in the winter and early vegetation in the spring. In the low districts there is little frost and snow, but the climate is mild and rather moist; and thus a languid vegetation is supported during the winter, and the pastures constantly retain their verdure.

The rent of every farm is derived chiefly from rearing and feeding the true Galloway cattle, except in the mountainous districts, where sheep and Highland beasts are grazed. There are very few exclusively tillage lands, or dairy farms, where cows are the principal stock and kept for making cheese. In the few districts in which cows are introduced, they are of the Ayrshire breed, which are undeniably better milkers than the Galloways.

On every farm a portion of the land is tilled, but the corn crop is quite a subordinate consideration; the object of the farmer being to produce straw and turnips and other food for the cattle in winter, and to improve the pasture grounds. The young cattle are chiefly bred and reared to a certain age upon the higher districts, or upon the inferior lands in the lower grounds. A few cows are kept in the richer soils to produce milk, butter, and cheese for the families, but it is found more profitable to breed and rear the cattle upon inferior lands, and afterwards to feed them upon the finer ground, and the rich old pastures. There would probably be no objection to this if the Galloway farmers would afford their young stock a little shelter from the driving blasts of winter. No inconsiderable number of the Galloway farms are as low as 50*l.* per annum, and even lower; a greater number are from 300*l.* to 500*l.*, while a few may reach nearly or quite 1000*l.*; but the average rent may be fairly computed at about 200*l.* per annum.

The calves are reared in a manner peculiar to Galloway. From the time they are dropped, they are permitted to suck the mother more or less, as long as she gives milk.* During the first four or five months they are

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feeding season, whence the greater part of them are removed in the winter and spring (when fat) to supply the consumption of the capital, where they are readily sold and at high prices, for few or no cattle sell so high in Smithfield market, owing to their laying their fat on the most valuable parts; and it is no unusual thing to see one of these little bullocks outsell a coarse Lincolnshire bullock, although the latter is heavier by several stones.' —Culley on Live Stock, p. 59.

Mr. Lawrence says, in his excellent treatise on cattle, that 'the pure Galloway breed exist perhaps no where in original purity except in the moors of Monigaff and Glenlove, and that these cattle are thinner in the hinder quarters than such as have been crossed by other breeds.'—p. 79.

* Mr. Culley gives a curious account of this—'The calves, from the time they are

allowed, morning and evening, a liberal supply; generally more than half the milk of the cow. The dairy-maid takes the milk from the teats on one side, while the calf draws it at the same time, and exclusively, from the other side. When the calf begins to graze a little, the milk is abridged, by allowing the calf to suck only a shorter time, and he is turned upon the best young grass on the farm. In winter he is uniformly housed during the night, and fed upon hay with a few turnips, or potatoes; for the breeder knows that, if he is neglected or stinted in his food during the first fifteen months, he does not attain his natural size, nor does he feed so well afterwards.

The practice of allowing the calf to suck its mother is objected to by some, and is apparently slovenly, and not economical; but the rearing of cattle is considered of more importance than the money that could be realized from the milk and butter saved by starving the calf. It is also imagined that the act of sucking produces a plentiful supply of saliva, which materially contributes to the digestion of the milk and the health of the calf. The Galloway farmer maintains that an evident difference may be perceived between the calf that sucks its dam, and another that is fed from the pail—the coat of the former is sleek and glossy, indicating health; while the hide of the other is dry and hard, nor is the unthrifty appearance removed until some time after the animal has been weaned and fed wholly on grass. It is also said that a greater proportion of calves fed from the pail die of stomach complaints, than of those that suck the cow.

It is desirable that the calves should be dropped in the latter part of the winter or the beginning of spring. A Galloway farmer attaches a great deal of importance to this, for he finds that nearly a year's growth and profit is lost if the calf is born in the middle of the summer.

The regular Galloway breeders rarely sell any of their calves for veal:* that is obtained only from those who keep cows for supplying the villagers with milk, and from the few dairy farms where cows are kept for making cheese.

The best *queys* are retained as breeders, in order to supply the place of those whose progeny is not valuable, or who are turned off on account of their age. The other female calves are spayed during the first year. The spayed heifers are usually smaller than the bullocks, but they arrive sooner at maturity; they fatten readily; their meat is considered more delicate, and, in proportion to their size, they sell at higher prices than the bullocks.

Mr. Culley says, 'In Galloway they spay more heifers than perhaps in

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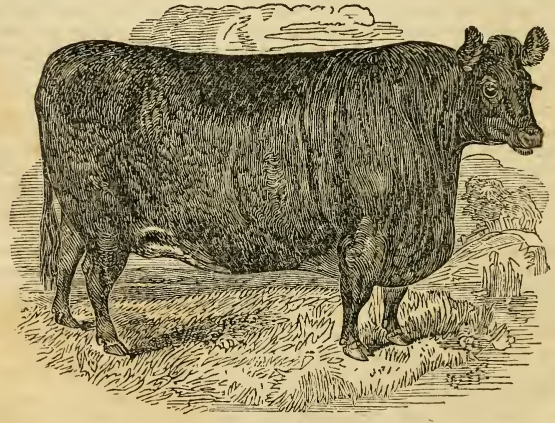
dropped, until able to support themselves, are allowed to run with their dams, but are prevented from sucking by means of a small piece of leather, with sharp spikes of iron fixed upon the outside, tied upon the upper part of the calf's nose, which, by pricking the cow every time the calf attempts to suck, prevents her from letting it, until the milk-maid comes, when she takes off the muzzle from the little animal's nose, and while she strips two of the teats, the calf takes care to empty the other two. As soon as the maid has done, she fixes on the instrument again, but it is done in such a manner as not to hinder the calf from feeding upon the grass.' This might have been the practice in Mr. Culley's time, but little or nothing of it is seen now.

* It is an old proverb in Galloway, that a good farmer would rather kill his son than a calf. 'The people of this country do very seldom, or rather not at all, kill or sell their calves, as they do in other places, so that it is a rare thing to see veal, except sometimes, and at some few gentlemen's tables. They give two reasons for this: one is, because, they say, a cow will not give down her milk without her calf, and so, should they sell or kill the calfe, they should want the use of the cow; but this, I suppose, might be helped, would they but traine up the cow otherwise at her first calving. The other reason is of more weight, viz., since a great part of their wealth consists in the product of their cattel, they think it very ill husbandry to sell that for a shilling, which, in time, would yeeld pounds.'—Symson's 'Large Account of Galloway,' 1682.

all the island besides, and in this too their method is different from any other part I am acquainted with, for they do not castrate them until they are about a year old, whereas in every other place I know the heifer calves are spayed from one to three months old; and it is now generally admitted as the safest practice to castrate calves and lambs, male or female, while very young.' They are now generally spayed much earlier than they used to be, but some of the breeders adhere to the old custom.

The young cattle are rarely housed after the first winter; they are on their pastures day and night, but in cold weather, they receive hay and straw in the fields, supporting themselves otherwise on the *foggage* left unconsumed after the summer grass. Many of the farmers are beginning to learn there true interest, and the pastures are not so much overstocked in summer as they used to be, and a portion of herbage is left for the cattle in the winter; therefore, although the beasts are not in high condition in the spring, they had materially increased in size, and are in a proper state to be transferred to the rich pastures of the lower district.

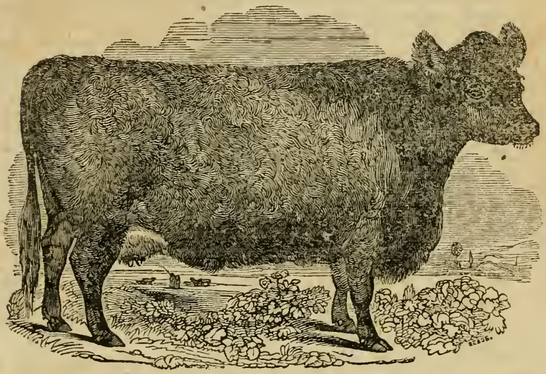
Mr. Craig of Arbigland, in Kirkcudbright, introduced the green crop husbandry into Galloway about the year 1770. He began about that time to raise drilled crops of potatoes, turnips and cabbages, and is considered the father of agriculture in the south-west of Scotland: many years, however, passed before the generality of the farmers followed his example. The culture of potatoes began to become general about 1780, but the other green crops have never been universally cultivated. Turnips are produced extensively on a few farms; turnips and rape in a less proportion to the size of the farm; but, more generally, there are yet too many farms on which neither of them is grown.



[*Galloway Heifer.*]

This cut is the portrait of a beautiful heifer, deservedly called the 'Queen of Scots,' bred also by Mr. Mure, and grazed by Mr. Wright of Rougham in Norfolk. The following were her proportions: height of shoulder, 5ft. 2in.; length from nose to rump, 10ft. 4in.; width across the hip, 2ft.

6in.; across the middle of the back, 3ft.; across the shoulders, 2ft. 4in.; girth of leg below knee, 8in.; distance of breast from the ground, 1ft. 3½in.; width between fore legs, 1ft. 5in. The weight was 190 stones, of 8lb. to the stone, or 108 stones 10lb. imperial weight. She was exhibited at the Smithfield Cattle Show, and her portrait engraved under the sanction of the Club.



[*Galloway Cow.*]

This cut contains the portrait of a beautiful Galloway cow, belonging to Mr. Gurney, near Norwich.

The Galloway cows are not good milkers; but although the quantity of the milk is not great, it is rich in quality, and yields a large proportion of butter. A cow that gives from twelve to sixteen quarts of milk per day, is considered a very superior milker, and that quantity produces more than a pound and a half of butter. The average milk, however, of a Galloway cow cannot be reckoned at more than six or eight quarts per day, during the five summer months after feeding her calf. During the next four months she does not give more than half of that quantity, and for two or three months she is dry.

It has been said that the young Galloway cattle are more exposed than others to *Redwater*, particularly on grass lands that have not been manured with lime. This disease, however, is easily checked at an early period by a few doses of Epsom salts, and removing the animal to good young grass, where the field has been recently limed. *Quarter Evil* is also a frequent and fatal disease among these young cattle. From its highly inflammatory character, it must be attacked in its earliest stage, or medical skill will be of no avail. When, however, the Galloways become two years old, they will yield in hardihood to none, and are comparatively exempt from every complaint.

It has been remarked in this, as in some other breeding districts, that cows and queys of good quality are to be met with every where, but that it is difficult to find a Galloway bull free from defect. Too many breeders have become careless from this circumstance. They have been contented with a bull of moderate pretensions, and the form and value of their cattle have been depreciated; yet not to the extent that might be feared, for the imperfections of the sire do not always appear in the progeny, but the sterling characteristics of the Galloway cattle break out again, although obscured in one generation.

A bullock well fattened will weigh from 40 to 60 stones at 3 or 3½ years old, and some have been fed to more than 100 stones imperial weight, at 5 years old. The average prices for good Galloway beasts may be stated as follows. *Stirks* at about 15 months old are worth from 3*l.* 10*s.* to 4*l.* 10*s.* per head; cattle of 2 years old will bring from 6*l.* to 8*l.*, and at 3 and 3½ years, they ought to sell at 10*l.* or 12*l.* per head; this, however, supposes them to be sold in the lot, and no particular beast selected.* Since the year 1818, Galloway cattle, like all others, have fallen in price, nearly or quite one-third.

It has often and truly been remarked, with regard to the Galloway cattle, that while in most districts there may be some good beasts, but mingled with others of a different and very inferior kind, there is a uniform character, and that of excellence, here; one bullock selected at haphazard may generally be considered a fair sample of the lot. The breeders know, from long experience, what kind of cattle will please the farmers in Norfolk, and by whom they are chiefly prepared for the London market, and to that kind of cattle they most carefully adhere. The drover, likewise, becomes by his profession, an excellent judge of cattle, which he often purchases in large lots. He is unable to handle half of them, but long practice has taught him to determine at a glance whether they are of equal value and will prove good feeders, and in the Galloway phrase, 'will sell best at the far end.'

The chief sales for the southern markets take place in September and October, to suit those at St. Faith's on October the 17th, and Hampton on November the 16th. The cattle are sent off in droves of from 200 to 300, under the charge of a person called the *topsman*, who generally goes before to see that grass is secured at proper stations and to make all necessary arrangements, and who has under him other drovers, in the proportion of one to about 30 cattle. The journey to Norfolk occupies about three weeks. The expense in summer and autumn is from 1*l.* to 1*l.* 4*s.* per head, and in winter, when they are fed with hay, they cost 10*s.* or 15*s.* per head additional.

The cattle are purchased and paid for by the drovers, sometimes in cash, but more generally a part of the price is paid in bills, and sometimes the whole of it. In some instances, where the farmer has confidence in the drover, he consents that the purchase money shall be remitted from Norwich, or that the money shall be paid when the jobber returns to Galloway. The business is hazardous, and now and then unfortunate; but the drover considers himself well paid, if, every expense of the journey being discharged, he clears from 2*s.* 6*d.* to 5*s.* per head; and when he has either money or credit sufficient to take a drove of 600 to 1000 head of cattle to the market, that is a good remunerating price. From 20,000 to 25,000 cattle are disposed of in this way every year, of which about two-thirds are bullocks and one-third heifers.†

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* The age of the beast is reckoned somewhat differently from that of horses; they are called two years old until they are three, and three years old until they are four.

† The Galloway farmers, who breed for sale, however, are continually on the watch for a favourable opportunity of disposing of a portion of their stock; and there are others in the richer districts of the country who consider it more profitable to buy young cattle than to keep a large breeding stock. They, too, are continually buying and selling; and

There is, perhaps, no breed of cattle which can be more truly said to be indigenous to the country, and incapable of improvement by any foreign cross than the Galloways. The short-horns almost every where else have improved the cattle of the districts to which they have travelled. They have, at least in the first cross, produced manifest improvement, although the advantage has not often been prolonged much beyond the second generation; but even in the first cross, the short-horns have done little good in Galloway, and, as a permanent mixture, the choicest southern bulls have manifestly failed. The intelligent Galloway breeder is now prefectly satisfied that his stock can only be improved by adherence to the pure breed, and by care in the selection.

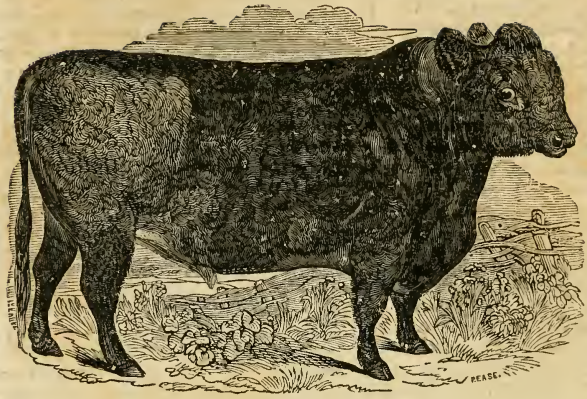
thence, according to Mr. Smith, arose a peculiarity in the character of the Galloway farmer. We do not believe, as he seems to think, that it belongs to the greater portion of them, but some features of it are yet to be traced in some of the cattle breeders and graziers. We give it in his own words in his Survey of Galloway. 'Frequent transfers of cattle are necessary, and he seems to acquire the habit of buying and selling without any other object than the prospect of a good bargain. Some of them, therefore, keep a bullock more than a year, or when markets are brisk, not more than a few weeks. With very good judges this has succeeded to a great degree. Some of the most opulent farmers have been indebted for their success to their skill in cattle and their address in striking a bargain; and this success has tempted others to embark in the trade, without either the talents or resources for carrying it on. The truth is, it possesses all the fascination of the gaming table. The fluctuation and uncertainty of markets, the sudden gains and losses that follow, the idea of skill and dexterity requisite, the risk connected with the business, these excite the strong passions of the mind, and attach the cattle-dealer, like the gambler, to his profession, although he may be assured that he is frequently pursuing the road to ruin. He counts his gains, but seldom calculates his losses. After a long succession of bad luck, he hopes that a few successful adventures will enable him to retrieve the desperate situation of his affairs, and the failure and ruin of those who have been gambling in a large way are productive of great detriment to the agriculturist and the community generally. The inevitable consequence of this mode of proceeding is, that the farmer is a constant attendant on fairs and markets whether he has any thing to do or not. One or two days in the week are useless, or worse than useless. That accurate attention to minutiæ on which so much of the farming business depends, order and regularity in his habits, are forsaken and forgotten; serious expenses, exceeding his profits, are incurred; habits of dissipation are contracted; every moral principle is gradually sapped and destroyed and he becomes at last disqualified for any business or employment.' This is a dark picture. It is not so true and faithful a one as it formerly was, but the farmer may learn wisdom.

Of the lower kind of dealers, Mr. Ross, in one of his statistical accounts, gives a very vivid description.

'A mountaineer will travel from fair to fair for 30 miles round with no other food than the oaten cake which he carries with him, and what requires neither fire, table, knife, nor other instrument to use. He will lay out the whole, or perhaps treble of all he is worth (to which the facility of the country banks is a great encouragement) in the purchase of 30 or 100 head of cattle, with which, when collected, he sets out for England, a country with the roads, manners and inhabitants of which he is totally unacquainted.

'In this journey, he scarcely ever goes into a house, sleeps but little, and then generally in the open air, and lives chiefly upon his favourite oaten bread. If he fail of disposing of his cattle at the fair of Carlisle, the usual place of sale, he is probably ruined, and has to begin the world, as he terms it, over again. If he succeeds, he returns home only to commence a new wandering and a new labour, and is ready in about a month perhaps to set out again for England.

'There are others who job about from fair to fair without leaving the country. The wandering and unsettled habits which this species of life induces are very unfavourable to improvement; whenever by any accident the cattle trade is suspended, or becomes unprofitable, the persons accustomed to be employed in it, being unfit for any soberer occupation, remain in a great measure idle. Even agriculture is burdensome to them as wanting the variety and interest which their usual occupation affords: thus the fruits of so much labour and enterprise are often wasted during the long intervals of indolence and inactivity' The drovers, however, of the present day, deserve a far better character, and are, generally speaking, a very respectable and deserving class of men.



[*Galloway Bull.*]

For this cut also we are indebted to Mr. Gurney.

The Galloway cattle are generally very docile. This is a most valuable point about them in every respect. It is rare to find even a bull furious or troublesome.

The Rev. Mr. Smith, in his Survey of Galloway, has some very good remarks on the old management of the breeds here, and a little applicable to some of the present day. 'The graziers in Galloway are generally censurable for overstocking, although they are less so now than at former times, or perhaps than the graziers of some other districts. Their greatest fault lies in their winter and spring management, and this is more the effect of necessity than choice, for the bulk of farms cannot keep the same number of cattle in winter as in summer, and, on a reduction of prices, which often occurs about the end of autumn, they must either sell to great disadvantage or wait the issue of the spring market. Hence in ordinary pastures the full stock of summer still remains with but a scanty allowance of fodder, and are compelled by hunger to devour every remnant of grass, and leave the fields naked and exposed, and thus not a little retard the subsequent vegetation. But this is not all; for, from the deficiency of fodder, the cattle are eager to snatch up every pile of new grass as it rises, and the pasture being thus kept completely eaten down, and denuded in this first vigorous period of vegetation, never afterwards acquires a full growth, nor can it feed the same stock in summer which it might have fattened under better management. Every experienced grazier knows the great advantage of sparing his pastures in spring, until they have acquired their full cover of herbage.'

During the last fifty years a very great improvement has taken place both in the tillage management, and in the rearing and grazing of cattle in Galloway. Most of the great landholders farm a portion of their own estates, and breed and graze cattle, and some of them very extensively. Agricultural societies have been established in the counties of Kirkcudbright and Wigton, and all the land-proprietors, and the greater part of the tenants, have become members of them. These societies have been enabled to grant numerous premiums for the best tillage husbandry and management of stock, and rearing of stock, and the consequence has been very considerable improvement in the breed of cattle, on the undeviating principle, however, of selection and adherence to the pure breed. Of the grazing properties of these valuable cattle, we cannot give a more satisfactory illustration than by stating, that 60 Galloways were bought in September last at Barnet fair for 10*l.* per head, to be turned into his Majesty's Home Park at Hampton Court, and are now, (March, 1833,) after being fed occasionally with hay, selling at an average of 18*l.* each.

About ten thousand Irish cattle are annually landed at Port Patrick in Wigtonshire, a few of which remain in that district, but the greater part find their way into England. Port Patrick is well situated for this purpose, on account of the shortness of the passage from Ireland. This commerce was once prohibited, from the absurd notion, that it would be detrimental to the interests of the English breeders; at length it was permitted for seven years by way of experiment, in the fifth year of George III., and made perpetual in the sixteenth year of the reign of the same monarch. There is a great deal of speculation attending this traffic in cattle. It is influenced materially by the quality of grass, and hay, and turnips in England, or by the probability of large crops of these articles, and large sums are often speedily gained or lost in the speculation.*

DUMFRIES.

This is a considerable wedge-shaped county, interposed between Lanark, Peebles, Selkirk, and Roxburgh on the east, and Kirkcudbright on the west, and divided from Cumberland by the river Liddel. The native cattle of Dumfries were, according to Dr. Singer, in his survey of that county, horned, long in the leg, narrow in the back, thin and short in the hair, and neither weighty for their height nor hardy. These, however, have been superseded by the Galloways for grazing, and by the Ayrshires, which in their turn have partly yielded to the short-horns, for milking. There is beside a fluctuating and uncertain number of flying stock consisting of Highlanders, principally from Falkirk tryst, and even a few Irish which are grazed a part of the year, or wintered in the county.

The richer pasture of Dumfries has given to the Galloways, bred or grazed there, a somewhat larger form and earlier maturity, than they possess in their native district, and on this account they used to be held in much estimation. They were bought at the Dumfries market by the Galloway farmers themselves, who after keeping them for a certain time, drafted them among their own cattle of a twelvemonth older, and sent them for sale to Carlisle. It was doubtful, however, whether these beasts had the perfect form of the native Galloways, and whether the fine grain and flavour of their meat were not somewhat deteriorated. The cattle market at Dumfries is the largest in the south of Scotland.

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* Dr. John Scott, in his account of the parish of Swyneholm in Kirkcudbright, in 1795, describes the polled Galloways as then highly valued by the Norfolk farmers. They would, at one year old, bring from 2*l.* to 5*l.*; at two years old, they would bring from 4*l.* to 9*l.*; and at three years, from 6*l.* to 10*l.* At that time, the best of the two years old were usually sent with the three years old to the English market. Speaking of the attempts at improvement, he says, 'our farmers cannot be too careful to preserve this breed, for any trials to meliorate it by crossing with other bulls have hitherto failed. A gentleman in this county, who had a large dairy remarkable for rearing the best cattle, and who kept and fed them until a proper age, when he sent them with other cattle which he bought from his tenants to the English markets, in order to try the experiment, purchased one of Mr. Bakewell's bulls. He put one half of his cows to this beast, and the other half to a Moorland bull bred upon his own estate. He fed the product equally until they were sent to market at Norfolk, when those bred from the Galloway bull brought considerably more money than the others, besides being easier to feed.'

'On the other hand, the Rev. Mr. Wilson, in his account of Kirkbean, says that Mr. Craik of Arbigland introduced the Bakewell breed upon his estate, and that the same number of cattle upon the same field fattened equally with those of the Galloway kind.'

The Rev. Mr. Wilson gives the following account of the cattle of Dumfries in 1811. 'The cows for breeding are principally of the Galloway kind. The return or annual profit per cow is about 6*l.* The young two-year-old bullocks kept for grazing are one-half Galloways, and the other half West Highlanders, bought at Falkirk tryst in October; and, after being fed one year, they are sold to drovers to be forwarded to the English markets, after having yielded to the grazier a profit of 3*l.* 3*s.* per head. Others sell them early in the summer, after having fed them on fog-hay in the fields during the winter, and usually given from 1*l.* to 2*l.* per head.*

A very superior and finely flavoured butter is made on the borders of the Esk in this county. It is made from the cream only, and no part of the milk is churned. The milk is suffered to stand about 36 hours, when the cream is collected, and the different meals thrown together until there is enough to be conveniently churned at one time, or the cream has become a little sour of its own accord, and the sooner it is churned after it has begun to become acid, the better will be the butter.

Robert Burns rented a farm at Dunscore in Dumfries, and, not content with the Galloway breed, he introduced some of the west-country cows, which he thought would produce more milk. The climate did not agree with them, and the speculation was decidedly unsuccessful.

ANGUS POLLED CATTLE.

THERE have always been some polled cattle in Angus; the country-people call them *humlies* or *dodded* cattle. Their origin is so remote, that no account of their introduction into this country can be obtained from the oldest farmers or breeders. The attention of some enterprising agriculturists appears to have been first directed to them about sixty years ago, and particularly on the eastern coast, and on the borders of Kincardineshire. Some of the first qualities which seem to have attracted the attention of these breeders were the peculiar quietness and docility of the doddies, the easiness with which they were managed, the few losses that were incurred from their injuring each other in their stalls, and the power of disposing of a greater number of them in the same space.

A few experiments upon them developed another valuable quality—their natural fitness for stall-feeding, and the rapidity with which they fattened. This brought them into much repute during the revolutionary war, not only in their own country, where great numbers were fattened for the Glasgow and Edinburgh markets, but also in England, whither they were sent in numerous droves for the supply of Smithfield, and also of the army and navy. They were purchased for Smithfield chiefly by the Norfolk and Leicestershire graziers, and after from one year and a half to two years' English feeding they paid for their keep at least equal to the most approved English cattle. They were brought to the south under the denomination of Galloways, partly because they were a comparatively unknown breed, bearing much resemblance to the Galloways, and also because the purchasers of the Angus cattle were known to be extensive speculators in the Galloway beasts. They were usually fed off at about three years old, and reached to an average weight of sixty imperial stones.

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* A writer in the 'Gentleman's Magazine,' says that 'he was at the bridge end of Dumfries in 1736, when Anthony M'Kie, of Nellverton, sold five score of five years old Galloway cattle in good condition, to an Englishman, for 2*l.* 12*s.* 6*d.* each; and old Rob. Halliday, who was a tenant of a great part of Preston estate, said that he reckoned he could graze his cattle on his farms at 2*s.* 6*d.* per head, *i. e.* his rent corresponded to that sum.'

They have much of the Galloway form, and by those unaccustomed to cattle would often be mistaken for the Galloways. A good judge, however, would perceive that they are larger, somewhat longer in the leg, thinner in the shoulder, and flatter in the side.

Climate and management have caused another difference between the Angus doddies and the Galloways. The Galloways have to encounter a moist climate; they are in most cases wintered out in the fields, or at least receive only a scanty allowance of natural hay during the severest part of the season, and are chiefly sent to the Norfolk market in a lean state: hence they have a more robust appearance, a much thicker skin, and a rougher coat of hair than the Angus oxen. Forfarshire is a great turnip country, and has its fields for the most part inclosed; the cattle are regularly kept in straw-yards during six months of the year, receiving turnips with their fodder every day, and in summer they are grazed on comparatively dry and warm pastures. By this mode of treatment they look and feel more kindly than the Galloways.

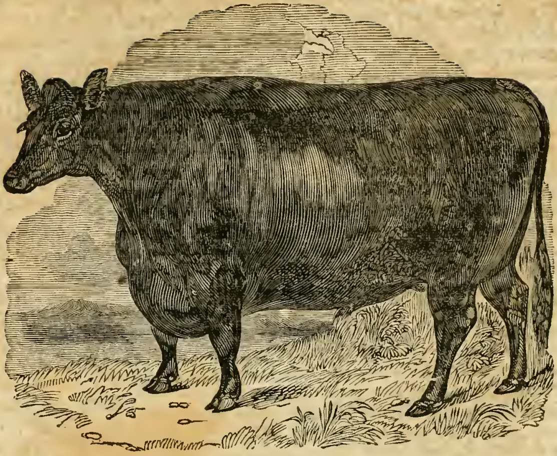
The greater part of them are black or with a few white spots. The next general colour is yellow, comprehending the brindled, dark red, and silver coloured yellow.

They are a valuable breed, and have rapidly gained ground on the horned cattle. They have become far more numerous than the others, particularly in the Lowlands; and when the agriculturist now speaks of the Angus breed, he refers to the polled and not to the horned species.

One of the most spirited and successful breeders of the dodded Angus cattle is Mr. Watson, of Keillor, by Meigle, in Angus, and to him we are indebted for much valuable information respecting the breed.

His stock of Angus cattle has deservedly obtained the name of the Keillor breed, and a most excellent one it is. He has gained, on account of them, more than 100 prizes, besides several valuable pieces of plate. The facilities which will now be afforded by the establishment of steam-carriage, will enable him and other enterprising breeders to send many beasts to the London market, which will find a ready and profitable sale there.

The following cut contains the portrait of one of a pair of oxen exhibited by him at the show of the Highland society at Perth, in 1829, and which obtained the prize as 'the best pair of oxen of the Angus breed.' He was afterwards sent to the Smithfield show, at the Christmas of the same year, when he was particularly admired. The butcher who purchased him, Mr. Sparks, of High-street, Mary-le-bone, with whom we have conversed on the subject, and who may be considered to be a competent judge, said, after he was slaughtered, that he was one of the best quality he ever saw, and he thought must have been the best of the breed that ever was exhibited. The meat was finally grained, and there were more than 240 lbs. of fat.

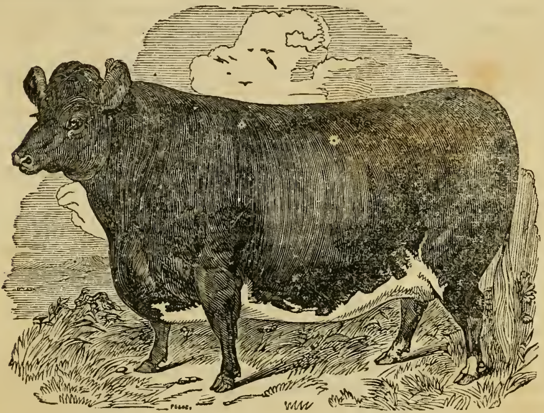


[*Angus Ox, Fat.*]

The next cut is a fair specimen of an Angus bullock, in good store condition. It was the property of Mr. Clarke, a dealer in polled cattle.

[*Angus Ox.*]

The following cut gives us the portrait of a heifer, bred and fattened by Mr. Watson. She was exhibited at the same show at Perth, and obtained the medal 'for extra stock of superior quality.' She also was sent to the Smithfield show, and obtained the medal in the class of extra stock. The Highland Society requested that she might be sent there as a sample of the excellence to which this breed of Scottish cattle could arrive: she was then 4½ years old. The chairman, in presenting the medal, stated 'that the judges deemed it their duty to mention her as a most extraordinary animal, and which they could not too highly commend. Her dead weight was estimated at 130 or 140 stones, and yet it was imagined that she had not arrived at her point of extreme weight. She sold for 50*l.* and was publicly exhibited for a considerable time before she was slaughtered, and realised a considerable sum for her purchasers.[*] We admired a very superior pair of Angus oxen, exhibited by the same gentleman at the show of the Highland Society, at Kelso, in 1832: one of them seemed to be perfect in all his points.[†]



[*Angus Cow.*]

We must however acknowledge that the Angus polled cattle generally are not of that very superior quality and value which this account of the Keillor breed would seem to indicate, or, what is the case with many other breeds, they are exceedingly valuable in their own climate and on their own soil, but they do not answer the somewhat unreasonable expectations of their purchasers, when driven to the south. They have yielded a good remunerating price, and the grazier has had no cause to complain, but they are not quite equal to their ancestors the Galloways in quickness of feeding, or fineness of grain. They attain a larger size, but they do not pay the grazier or the butcher so well. They have been fairly tried in the south, and, on the faith of the excellency of the Keillor breed, Mr. Watson sold a bull in 1831 for 100 guineas, and in the same year he sold a lot of breeding heifers in calf at the rate of 40*l.* per head, yet in many places the Angus cattle have gradually given way to the old occupiers of the land, the Galloways.

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[*] She was out of a very small cow with a remote dash of Guernsey blood in her, yet retaining all the best features of the pure Angus blood. The bone of her fore leg, which Mr. Watson has in his possession, was not thicker than that of a red deer, and she was exceedingly active to the last. When killed her breast was not quite 8 inches clear from the ground, and her inside fat was equal to a quarter of her whole weight of beef.

[†] At one year old this beast gained a prize at the annual show of the Strathmore Agricultural Society at Coupar, Angus; at two years old he also carried off the prize at the next show of the same Society. At three years old, he and another ox, also bred by Mr. Watson, gained the first premium of the same society for the best pair of fat oxen of any breed; and in the same year, the same pair were shown, as we have stated, at the meeting of the Highland Society at Perth.

The greatest shows of this kind of stock in Angusshire are at Brechin, in June, and Forfar in July and August. The beasts are chiefly purchased by English dealers. We saw a great many of them, and very fine ones too, at the Falkirk Tryst in October, 1832. When in good condition they sell, at 3 years old, at from 10*l.* to 15*l.*

In the statistical account of Angus it is said to contain 45,400 cattle; but there could be no certain grounds on which to form the calculation, the numbers depending on the season and on the quantity of keep. The flying stock bear a greater proportion to the whole number of cattle than in almost any other county.

The calves that were reared always fared better here than in many districts; they got nearly two gallons of milk, warm from the cow, every day for more than three months; and were then put on the best grass, and had turnips and hay, or sometimes only straw, in the winter, when they were always housed: the cows were also generally housed, except there was a scarcity of straw and other fodder, when, and especially in the hilly country, they were permitted to wander over some rough pasture during the day.

Mr. Watson, about 20 years ago, introduced the practice of suckling the calves in the house, and has since continued the system with great success. We find this plan thus described by himself in a letter to the conductor of a work on domestic animals, under the patronage of the Highland Society of Scotland.

'The cows intended for nursing generally calve early in the season, about the month of January or February, when a stranger calf is procured from some of the small tenants in the district who have dairies. This calf is suckled with the others, by the same cow; and, although the cow at first shows great dislike to the stranger, in a few days she receives it very quietly—care being taken that both are put to suck (one on each side) exactly at the same time, by tying the calves' bands to the stall, or the band of the cow, so as to keep each calf at its own side. They remain with the cow for fifteen or twenty minutes, by which time her milk is perfectly drawn away. As the calves advance in age they eat hay, sliced potatoes, porridge, and other food that they are inclined to take. By the 1st of May, or as soon as grass is ready, they are weaned and turned out from the byre, when two fresh calves are immediately put into their stalls and receive the same treatment, excepting that they are turned out at 12 o'clock, after they have got their suck, to eat grass, and are brought into the byre again in the evening, when the cows come in to be sucked. This set is ready to wean by the 1st of August, and a single calf is put into the feeding pen and fattened for the butcher, the season being now too late for rearing. As these are fed off, the cows are let off milk, having each suckled *five calves*. It is necessary to have a very careful and steady person to attend to the suckling, which has to be done three times a day, viz., early in the morning before the cows are turned out to grass, at mid day, and in the evening when the cows come into the byre for the night and get a little cut grass, tares, or other green food. The byre is arranged so that the cows have each a stall of about four feet wide, with their heads to the wall; and on the opposite wall the calves are tied up, two in a stall, exactly behind the cow, so that there is little trouble in putting them to the cows, and no chance of misplacing them. The fat calves have in some seasons been sold at 5*l*. each, this being the scarcest time of the year for veal.—Keillor, October 1831.'

The quantity of milk yielded by the dairy cows is various. In the hilly district from two to three gallons are given per day, but that is very rich. In the lowlands the cows will give five gallons during the best of the season. The cows of this district were formerly regarded as some of the best dairy-cows in Scotland, but since the breed has been more improved, and greater attention paid to the fattening qualities, they have fallen off in their character for the pail. About half of the milk is consumed at home, the rest is made into butter and cheese. The butter, as is generally the case in this part of Scotland, is good, but the cheese poor and ill-flavoured. No oxen are used on the road, and few for the plough.

Although there is so great a mixture of different breeds in Forfarshire, they are all of Scottish origin. The southern breeds have been repeatedly tried and have failed, and so has the Guernsey, which has contributed so much to the improvement of some English dairies.*

NORFOLK.

Having now returned to the districts with the character of the cattle of which the greater part of our readers may be supposed to be tolerably well acquainted, our description both of the peculiarities of the breeds of the different counties, and the general management of cattle, will be brief.

Until the beginning of the last century, and for some years afterwards, the native breed of Norfolk belonged to the middle-horns. Their colour was usually red, or sometimes black; they possessed many of the characters of the Devons on a smaller scale, with their pointed, turned up horns. A few of them are yet occasionally seen in the less cultivated parts of the county, and in the possession of the small farmer or the cottager. They have, however, been almost superseded by a *polled* breed.

We have stated that from a very early period, a great part of the Galloway cattle were prepared for the Smithfield market on the pastures of Norfolk and Suffolk; nearly one-half of the beasts that supply the metropolis come from these counties. Some of the Galloways, either accidentally, or selected on account of their superior form and quality, remained in Norfolk; and the farmer attempted to naturalize and to rear in his own county, and he hoped at somewhat less cost, a breed of cattle so highly valued in the metropolitan market. To a certain degree he succeeded; and thus the polled cattle gradually gained upon the horned ones, and at length became so much more numerous and profitable than the old sort, that they began to be regarded as the peculiar and native breed of the county.

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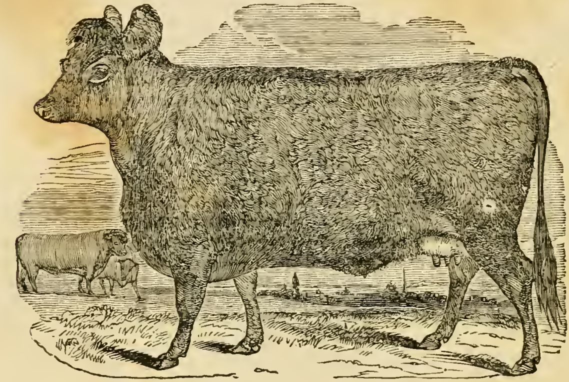
* Some curious sports in nature have been observed in the breeding of Angus doddies. One remarkable fact is stated by John Boswell, Esq., of Balmuto and Kingcaussie, in an essay upon the breeding of live stock, communicated to the Highland Society in 1825. 'One of the most intelligent breeders I have ever met with in Scotland Mr. Mustard, an extensive farmer on Sir James Carnegie's estate in Angus, told me a singular fact with regard to what I have now stated. One of his cows chanced to come into season while pasturing on a field which was bounded by that of one of his neighbours, out of which field an ox jumped and went with the cow, until she was brought home to the bull. The ox was white, with black spots, and horned. Mr. Mustard had not a horned beast in his possession, nor one with any white on it. Nevertheless, the produce of the following spring was a black and white calf, *with horns*.' Another fact, which shows the great care required in keeping pure this breed, is related of the Keillor stock, where, two different seasons, a dairy cow of the Ayrshire breed, red and white, was allowed to pasture with the black doddies. In the first experiment, from pure black bulls and cows, there appeared *three* red and white calves; and on the second trial *two* of the calves were of mixed colours. Since that time care has been taken to have almost every animal on the farm, down to the pigs and poultry, of a black colour.

They retain much of the general form of their ancestors, the Galloways, but not all their excellences. They have been enlarged but not improved by a southern climate and a richer soil. They are usually red, some, however, are black, or either of these colours mixed with white, with a characteristic golden circle about the eye. They are taller than the Galloways, but thinner in the chine, flatter in the ribs, longer in the legs, somewhat better milkers, of greater weight when fattened, but not fattening so kindly, and the meat not quite equal in quality.



[*Norfolk Cow.*]

This cut presents a favourable specimen of them. The cow was bred by Mr. George of Eaton in the neighbourhood of Norwich. This beast, at least, is an exception to the censure which has been passed upon them as 'ugly and mishaped.'

Although too little care is taken in any part of this county to improve the breed, yet it has been improved in many districts, not only in attaining larger weights at all ages, but in the quality of the meat being considerably better; yet it must be confessed, that the Galloways afforded so ample a remuneration to the Norfolk grazier during their temporary abode with him in their journey to the Smithfield market, that the home-bred cattle were, after a while, comparatively neglected.

Norfolk is principally a grazing county, and the cattle chiefly grazed there are the Galloway Scots. The following estimate of the expense and profit in feeding them, is taken from the Agricultural Survey of Norfolk, and was furnished by Mr. Barton. The more complete establishment of the turnip husbandry has made some alteration, and that in favour of the grazier.

'Of the Scotch cattle, there are three sorts which require consideration; the first is a bullock, turned of four years old, and bought at St. Faiths October 17th, for about 9*l*., and in such condition as to be fit to be put immediately on turnips. He is put on turnips, and kept there about 24 weeks; in bad weather a little hay is given, and when to this is added the customary straw, carriage, attendance, &c., the expense will amount to about 4*s.* per week, bringing the cost of the ox to 13*l.* 16*s.* He will now probably weigh from 50 to 52 stones of 14lbs., which at 5*s.* 6*d.* per stone, or 3*s.* 8*d.* per Smithfield stone of 8 lbs., will amount to 14*l.* 16*s.*, leaving only 1*l.* clear profit per head.

A second lot, and a year younger, is probably bought lean at the same time, and at about 6*l.* They are put on stubble or ordinary grass, until the straw-yard is open. They are then sent into the straw-yard at night, where they eat the offals of every description, and follow the best beasts during the day. This, for 24 weeks, until May day, and at 1*s.* 6*d.* per week, will amount to 1*l.* 16*s.* They are then put into the marshes, or on good pasture. until a fortnight after Michaelmas, which, reckoning 28 weeks at 2*s.* 3*d.* per week, will cost 3*l.* 3*s.* more; then to turnips for 8 weeks at 3*s.*, which will be 1*l.* 4*s.*, and amounting in the whole to 12*l.* 3*s.* The weight of the bullock will now generally be about 44 stones, and the value 12*l.* 2*s.*

A third lot is probably bought at Harleston in December. The beasts are lean, of the same age, and the price averages at about 7*l.* per head. They are sent immediately to the straw-yard, and fed on offal turnips for 8 weeks at 1*s.* 6*d*; per week, and amounting to 12*s.* They then go on full keeping, turnips by day, and the straw-yard at night, for 10 weeks, which at 2*s.* 6*d.* per week, will give an additional expense of 1*l.* 5*s.* They then go into the two years' lay, or good pasture, for 20 weeks, making, at 3*s.* per week, 3*l.* more, which brings their cost to the grazier to 11*l.* 17*s.* They will now probably weigh 46 stones, which at 5*s.* 6*d.* per stone will amount to 12*l.* 13*s.*

It would appear from these calculations that the first lot paid 10 per cent. interest on the capital laid out, and a fair price for what they consumed. The second yielded no interest on the original cost, but a fair price for the food; and the third gave 15 per cent. in addition to the same remunerating price; but to this seemingly little profit must be added the increased value of the succeeding crops, from the great quantity of manure.

The grand fairs for the purchase of the Galloway cattle are at St. Faiths, on October 17th;* Hampton Green, November 22d; and Harleston, November 28th. The *horned* Scotch cattle are often grazed, although not to the extent of the Galloways. Mr. Marshall, in that valuable work, 'The Rural Economy of Norfolk,' gives the following account of two lots of Kyloes. The buying and selling prices are now very different, but the proportion between them is nearly the same. 'How profitable are the little Isle-of-Sky cattle to the Norfolk farmer, who has rough meadows for them to run in? ——— had eleven, bought last Hemlingreen fair, (just twelve months ago,) for three guineas a-piece. They were kept entirely on straw and rushy grass, which nothing else would have eaten, until the month of May, when they were turned into some Norfolk meadows, (worth about ten shilling an acre) where they remained until September, since which time they have been at good lattermath. Some of them are now quite fat, and the rest nearly so; one with another they are worth about six pounds a piece.

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* Mr. Marshall thus describes the Fair of St. Faiths:—

On Wednesday, 17th instant, I went to the first day of the fair of St. Faiths, a village near Norwich, where one of the largest fairs in the kingdom is held annually onthat day, for cheese and butter, and a variety of wares, but most especially the first, which is brought in great quantities out of Suffolk to supply this country during the winter months, when a Norfolk cheese is not to be purchased in this part of the country.

The first day of this fair also draws together a good show of cattle, principally 'home bred,' either for store or for fatting on turnips, and for which purposes a show of Scotch bullocks is also exhibited upon a rising ground at a small distance from the fair-field.

The sale of Scotch cattle continues for a fortnight, or longer time, until this quarter of the county be supplied with that species of stock.—Marshall's Economy of Norfolk, ii. 49.

	£.	s.	d.
Supposing each occupied an acre of meadow, which (with town charges) reckon at	0	12	0
Ten weeks' lattermath, at two shillings (the price of such cattle)	1	0	0
First cost and interest	3	6	3
Total cost	4	18	3
Present value	6	0	0
Clear gain, besides a fair remunerating price for the meadow ground and aftermath . . .	1	1	9

A neighbouring farmer bought a parcel at the same time, and at the same price; also some refuse ones so low as five-and-twenty shillings a-piece; two of which he sold a few days ago for 11*l.* 4*s.*

These, however, were followers at turnips the first winter. In summer they were sent to a grazing ground; since harvest they have been in the stubble and 'rowens' at good keep.*

The short horns have established themselves in many parts of Norfolk. Some of them are bought in to graze, and others are bred there with considerable success. The Devons have zealous advocates in Norfolk. The Earl of Albemarle's straw-yard and sheds rarely contain fewer than 60 of them every winter; and Mr. Coke, while he selects the Devons for his dairy, is zealously employed in grazing and winter feeding the improved short horn. The Devons are selected for whatever husbandry work is performed by oxen in Norfolk.

SUFFOLK.

The Suffolk Dun used to be celebrated in almost every part of the kingdom, on account of the extraordinary quantity of milk that she yielded. The dun colour is now however, although occasionally met with out of the county, rarely seen in Suffolk, and rejected as an almost certain indication of inferiority. The breed, consistently with the title of the chapter under which it is placed, is in general *polled*, but some of the calves would have horns if they were reared, and even in the polled the rudiment of a horn is often to be felt at an early age.

The Suffolk, like the Norfolk beast, undoubtedly sprung from the Galloway; but it is shorter in the leg, broader and rounder than the Norfolk, with a greater propensity to fatten, and reaching to greater weights. Mr. John Kirby, the author of 'The Suffolk Traveller,' published nearly a century ago, describes the Suffolk cow as having 'a clean throat, with little dewlap, a snake head,† thin and short legs, the ribs springing well from the centre of the back, the carcass large, the belly heavy, the back-bone ridged, the chine thin and hollow, the loin narrow, the udder square, large, loose and creased when empty, the milk veins remarkably large and rising in knotted puffs; and this so general, that I scarcely ever saw a famous milker that did not possess this point, a general habit of lameness, hip bones high and ill covered, and scarcely any part of the carcass so formed and covered as to please an eye that is accustomed to fat beasts of the finer breeds.' The prevailing and the best colours are red, red and white, brindled and a yellowish cream colour. The bull is valued if he is of a pure and unmingled red colour. In no part of the kingdom were the farmers more careless as to the breed, providing only that the cows were true Suffolks. They merely inquired whether the bull came from a dairy of good milkers; and even the cows which they rarely kept in milk for more than two or three years, they bought at the neighbouring markets and fairs much oftener than they bred them.

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* Marshall's Economy of Norfolk, ii. 74.

† There is much variation with regard to this. We have seen many Suffolk cows whose heads might be almost said to be clumsy, and who had their fair share of dewlap, but they were not celebrated as milkers, and being soon discarded on that account, fattened with great rapidity. There was too much of the Galloway blood about them.

Some exaggerated accounts have been given of the milking properties of the Suffolk cow, but, nevertheless, she is not inferior to any other breed in the quantity of milk that she yields. In the height of the season some of these cows will give as much as 8 gallons of milk in the day; and 6 gallons is not an unusual quantity. The produce of butter, however, is not in proportion to the quantity of milk.* The Rev. Mr. Aspin, of Cockfield, had three cows one of them a heifer with her first calf. They were kept on three acres only of grass, without any change of pasture until after mowing time, and in the winter chiefly on straw with very little hay. Both the old ones yielded 8 gallons of milk per day during the height of their season, and the quantity of butter made from June to December was 683lbs. The Rev. Arthur Young, the Secretary to the Board of Agriculture, forty years ago, adds, that one Holderness cow would have consumed all the food of the three, without returning half of the produce. There are few short-horn cows, although far superior in size to the Suffolks, and consuming nearly double the quantity of food, that will yield more milk than is usually obtained from the smaller polled breed.

Fifty thousand firkins of butter are sent to London every year from Suffolk, of which each cow furnishes on an average three firkins, each weighing $\frac{1}{2}$ cwt., with $\frac{3}{4}$ of a wey of cheese.†

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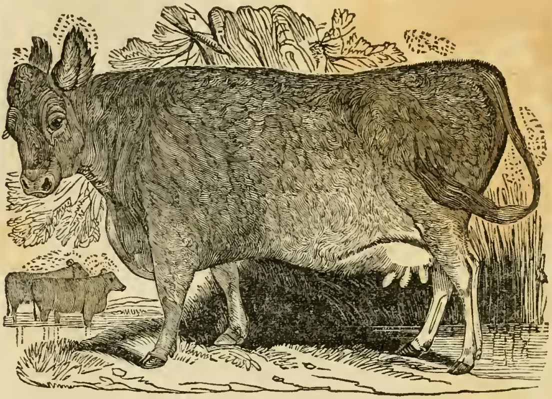
* Some experiments were made by Mr. Chevalier of Aspal, near Debenham, which would give a more favourable opinion of the richness of the Suffolk cow's milk. Three quarts of milk from a Suffolk cow, and the same quantity from a long-horn of Mr. Toosey's breed were set in separate bowls for 36 hours. The milk of each was then skimmed, and the cream from the milk of the Suffolk weighed $2\frac{1}{2}$ ounces more than that from the horned cow. The cream was after that put into two bottles and churned, and one quarter part more butter was extracted from the cream of the polled cow than from that of the horned one.

A variety of experiments, however, must be made before this question can be settled, and particularly in summer, when the milk of both is so much more abundant. The time which has elapsed from the calving of each should also be attended to, and the condition and food of the animals. The milk of a cow that keeps herself in good condition is well known to be more productive of cream and butter than that of a half-starved one, who possibly may yield a greater quantity of milk; and yet it may be questioned whether the superiority of quality always makes amends for the diminution of quantity. The most extraordinary milkers are usually the very worst looking animals.

† Mr. Culley extracts from Mr. Young's Survey of Suffolk, an estimate of the produce of one of the cows:—

	£	*s.*	*d.*
Three firkins of butter, each weighing $\frac{1}{2}$ cwt. at 32*s.*	4	16	0
$\frac{3}{4}$ wey of cheese	1	4	0
A hog	1	0	0
A calf	0	10	0
Total	7	10	0

A little good cheese is made in Suffolk, but generally speaking, the milk is more profitably converted into butter, and the cheese manufactured from the skim milk is alone of very inferior quality.



[*Suffolk Cow.*]

The cattle are, by the majority of the farmers, much better attended to than they were when Mr. Young wrote his 'Survey.' He says, that 'few cows were confined in the winter to a cow-yard, but the cattle ranged over the fields almost at their pleasure, poaching the land dreadfully. Sometimes however, they were tied up, in the field without house, or shed, or roof to cover them. A rough manger was placed on the ground in which tusnips or cabbages,* or straw was given to them, and small posts were driven into the ground 3ft. 6in. asunder, to which the cows were tied. A faggot hedge was set up before them, or they were placed before a thick hedge in order to screen them from the blast. They were regularly littered, and the dung was piled up behind them in the form of a wall, which served them for another screen; while a slight trench was dug at their heels to conduct away the urine.' It was imagined that this was better than letting

In his third edition Mr. Young calculating the butter and cheese at a higher price, makes the produce 8*l.* 12*s.* 6*d.*

Mr. Parkinson, a very excellent writer on the breeds and general treatment of cattle but not to be depended upon when he speaks of their diseases has the following very appropriate remarks on this, vol. i. p. 119, which we have somewhat condensed. 'When it is asserted that the best of the cows give 24 quarts of milk in one day, and that the profit of one of them for a year is only 7*l.* 10*s.*, the milk and the quantity of butter bear no sort of proportion to each other. There must be an error in the one; for if the produce of this cow be only calculated at half a year, or 26 weeks, the butter would he 184lbs. which at 1*s.* a pound, would give 9*l.* 4*s.*; the hog would be worth, in other butter and cheese counties 2*l.*; and the calf about 15*s.* Skim-milk cheese fetches from 2*l.* 5*s.* to 2*l.* 15*s.* in Dorsetshire and Somersetshire, which would make the produce amount to, 15*l.* 13*s.*, a sum much nearer the truth than that stated by Mr. Young.

* Forty years ago (1792) the practice of growing cabbages was almost universal among the dairy farmers; but the butter was sometimes bad when the cabbages began to be decayed and this vegetable did considerable damage to the succeeding crop. The culture of this food for milch cows is therefore in a great measure superseded.

them range at will, and that every kind of food went much farther. The farmers believed that they were more healthy and profitable when thus exposed to the weather; than if they had a roof over them, and that the warmth produced by their lying so close to each other, and by the screen before and behind, was sufficient. Mr. Young remarks, 'if they do as well as under sheds much expense is saved, but this is a very doubtful question.' When they had calved, or were near the time of calving, they were brought into the cow-house. The land is now thrown a great deal more open than it formerly was. These high, impervious hedges are rarely to be found, and this system of feeding in the field is comparatively seldom adopted.

There used to be, and still to a very considerable degree remain, some other points of bad management. Although the calves that are reared are selected according to the milking properties of the dam, few of the early dropped ones, which are generally the best, are saved. The price of veal then offers a temptation which the farmer cannot resist; and the young ones are fattened and disposed of as soon as possible. The selection is therefore made almost entirely from the later calves, and they have not so good a chance as the early-dropped ones would have had of becoming strong and hardy before winter, and thus acquiring a good constitution, and the certainty of thriving and yielding well.

[*Suffolk Bull.*]

Another instance of mismanagement is not always avoided even at the present day. He says that 'the bulls are rarely suffered to live after they are three years old, however excellent they may be, for the farmer believes that if they are kept longer they do not get a stock equally good, and particularly that their calves are not so large after that period.' Nothing can be more erroneous or mischievous. A bull is never in finer condition than from four to seven years old.

Beside this, the practice of the Suffolk breeders is subject to radical objection, for before the value of the progeny of a bull can be known he is slaughtered, so that if the cows got by him turn out to be the most excellent milkers, no advantage could be derived from the discovery, the sire of the stock being gone.

To such an extent was this absurd practice formerly carried, that Mr. Young justly observes that 'having obtained by accident, or by exertions, the memory of which is now lost, a good breed of milkers, the Suffolk people have preserved them almost by mere chance, and without any of the care and attention which their value demanded.

Somewhat of the same system was and is pursued with regard to the heifers. A heifer of scarcely two-years old, with a calf at her foot, is no rare object. This system of breeding before the form of either the sire or the dam is developed; this tax upon the power of nature to contribute to the growth of the young mother as well as to that of the calf, must be exceedingly injurious. She also at four-years old is frequently discarded and-fattened for the butcher, unless she has displayed more than usually good milking properties.

The Suffolk cow when thus discharged, poor and angular as she may look, fattens with a rapidity, not equal, indeed, to that of the Galloways, but greater than could be expected from her gaunt appearance. Whence she obtained the faculty of yielding so much milk, is a question that no one has yet solved. Her progenitor, the Galloway, has it not. The Holderness could scarcely be concerned; for more than a hundred years ago, the Suffolk dun was as celebrated as a milker, as the breed of this county is at present, and the Holderness had not then been introduced. The fattening property derived from the northern breed is not yet impaired. The discarded cow is easily fattened to forty or five-and-forty stones, and the quality of her meat is excellent.*

The grazing property of the Suffolk has been supposed to be increased by a cross with the short horn; but although they are both excellent milkers, their value has been uniformly lessened as milch cows by the admixture of the two, and the progeny, although better than the Suffolk for grazing, is decidedly inferior to the improved short-horn. Very few of the Suffolks, however, are bred for the mere purpose of grazing; for notwithstanding what we have said of their value in this respect, they are decidedly inferior to the pure Galloways.

Vast numbers of the Galloways are bought at the fairs after Michaelmas. The same management is pursued as in Norfolk, and the Galloways from Suffolk join those from Norfolk in their journey to the London market, in the spring and early part of the summer.

A great many Welsh cattle, and a few Irish, are also grazed, both in Suffolk and Norfolk; but they do not bear so high a price in the market as the Galloways, and their meat, although very good, is somewhat inferior. The short-horns are also establishing themselves in some parts of this county as grazing cattle; but as milkers, they cannot contest the palm with the Suffolks on their native soil. Some Devons are found, but they are not so numerous or such favourites as they are in Norfolk.

Lord Huntingfield has a very fine dairy of North Devon cows, and he spares no expense to procure the purest and most beautiful bulls from that district. In the year 1832, he gave two hundred and eighty guineas for a bull of that breed. His lordship is also very successfully engaged in the grazing and winter feeding of the improved short-horn. Some very fine beasts of his stock were exhibited at the last Smithfield cattle show, 1832.

There is no other breed of polled cattle of sufficient consequence to deserve distinct mention here. Mr. John Lawrence, in his excellent work on cattle, speaks of the Northern or Yorkshire polled cattle. He describes them as having the same qualities as the short-horns, of different sizes, but some of them carrying vast substance, and he thinks that most of the various breeds of horned cattle are attended with hornless, but perfectly congenial varieties. This is true to a very considerable extent. The *Devonshire Nats*, or polled cattle, now rapidly decreasing in number, possess the general figure and most of the good qualities of the horned beasts of that district; and the *Yorkshire polls* are almost as large as the horned beasts of that county, and as good for grazing and for the pail. Many breeders pay particular attention to the shape of the head in these polled cattle, and to a certain extent, also, in the horned ones. If the crown of the head is fine, like that of a doe, and drawn almost to a point on the top, the breed is supposed to be good.

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* Mr. Parkinson says—'The oxen of this breed weigh from 570 lbs. to 700 lbs.; and the cows from 420 lbs. to 560 lbs., and, in a general way, I do not find any beef before them.'

CHAPTER V.

THE IRISH CATTLE.

Before we enter on the consideration of the two remaining breeds of English cattle, the long and the short-horns, we will take a very rapid glance at the Irish cattle.

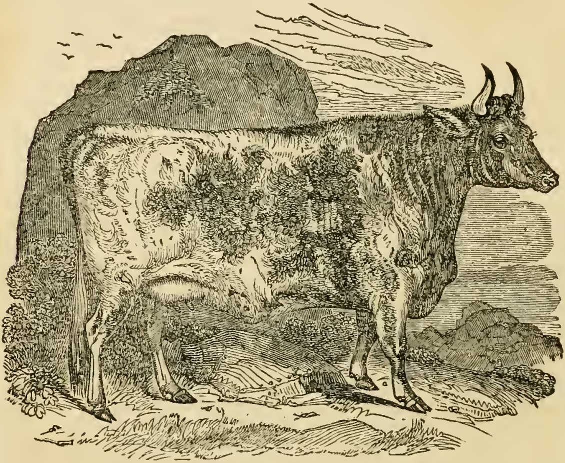
They are evidently composed of two distinct breeds; the middle and the long-horns.

The former is plainly an aboriginal breed. They are found on the mountains and rude parts of the country, in almost every district. They are small, light, active, and wild. The head is small, although there are exceptions to this in various parts, and so numerous, indeed, are those exceptions, that some describe the native Irish cattle as having thick heads and necks; the horns are short compared with the other breed, all of them fine, some of them rather upright, and frequently, after projecting forward, then turning backward. Although somewhat deficient in the hind-quarters, they are high-boned, and wide over the hips, yet the bone generally is not heavy. The hair is coarse and long; in some places they are black, in others brindled; and in others black or brindled, with white faces. Some are finer in the bone, and finer in the neck, with a good eye, and sharp muzzle, and great activity.

They are exceedingly hardy; they live through the winter, and sometimes fatten on their native mountains and moors; and when removed to a better climate and soil, they fatten with all the rapidity of the aboriginal cattle of the Highlands and Wales. They are generally very good milkers, and many of them are excellent in this respect. The cow of Kerry, with a portrait of which the reader is here presented, is a favourable specimen of them. Where they have much of the Kerry blood in them their very wildness proves them to be the native breed; for there is no fence nor ditch which they will not leap.

The cow of Kerry is truly a poor man's cow, living everywhere hardy, yielding, for her size, abundance of milk of a good quality, and fattening rapidly when required. The slightest inspection of the cut will convince the reader of the difference between this breed and both the larger and the smaller long-horned Irish one; were it not for the claddiness about the shoulder, and the shortness and thickness of the lower part of the neck, and the pied colour, we should almost fancy that we saw the middle-horn North Devon cow.*

These cattle usually run small, and are confined to the hilly and moor grounds, or to the scanty portion of land possessed by the cottager and the small farmer. There are, however, some exceptions to this. In Connaught, this breed runs to a very considerable size, and are improved in form as well as in weight. The horns, usually of middle length, turn up; as do the horns of those on the mountains; but they are shorter in the leg, and shorter in the body; their loins and haunches are heavy and wide; although the hair is thick, the hide is mellow, and they thrive with a rapidity rarely excelled by any other breed.



[*Kerry Cow.*]

Mr. Walker, of Belmont, in Wexford. informs us, that this breed is now not to be met with pure, except inland on the mountains; being nearly worn out in the more civilized parts of the country, by repeated crosses with the Leicester, the Hereford, and the Devon; but that for the dairy, all the farmers still prefer those cows which show most of the native Irish blood.

Mr. Culley seems to consider the middle-horn Irish as a mixed breed between the long-horns and the Welsh or Scotch, but most inclined to the long-horns. This is an opinion to which we can by no means assent. The very locality of these cattle, (the smaller varieties especially,)—the mountainous and comparatively inaccessible situation which they occupy, seem to point them out, like the Welsh and the Scotch, as the aboriginal breed, and to prove that one of a very similar character was indigenous to both islands.

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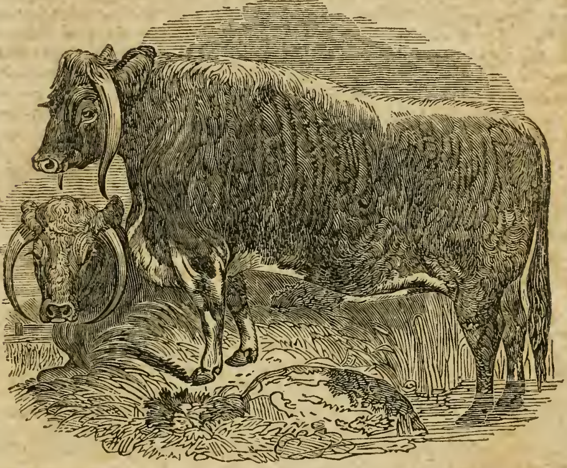
* Mr. Rawson, in his Survey of Kildare, gives the following description of the native Irish beast:—It should have a sweet, placid countenance—a neat, clean horn—head very small—neck very thin at the head, tapering gently, and increasing where it meets the shoulder, so as gently to cover it—shoulders flat, and thin in the blade—chine not too fine—chest very deep and full at the breast—ribs rising roundly and swelling from the chine couples close—hip not too wide, and nearly concealed by the high arching of the ribs, and the closeness of the couples—hind quarters broad and lengthy, narrowing gradually to the tail, which should be snug between the bones—the quarters on the outside flat, on the inside full, but not extending too low—legs fine, and clean in the bone, but not leggy.

The other breed is of a larger size. It is the old or the partially improved Craven or Lancashire beast, which we shall have presently to describe. It is the true long-horn; the horns first taking a direction outward, then forming a curve, and returning towards the face, sometimes threatening to pierce the bones of the nose, or at other times, so to cross before the muzzle, that the animal shall be unable to graze.

The following cut represents this large variety of Irish cattle, and is evidently identical with the Craven or Lancashire. In Tipperary, Limerick, Meath, a great part of Munster, and particularly in Roscommon, many of these cattle are found, of which, although we cannot say with the author of the Survey of the county of Dublin, that 'the cattle of Ireland are in such a progressive state of improvement, that in a few years the English themselves will be out-done, and will finally resort to us to improve their breed,' yet we can affirm that they are most valuable animals.



[*Irish Cattle.*]

Whence these long-horns originally came, is a question that has been much disputed. There is no doubt that they very much resemble the English long-horns, and have been materially improved by them; but whether Ireland or England was the native country of this breed will never be determined. Ancient records are silent on the subject; and in both countries we can trace the long-horns to a very remote period. As from very early times Ireland has materially contributed to the supply of the British capital and the British navy, and thousands of Irish beasts yearly traverse almost every part of Great Britain, from Port Patrick to the Thames, many persons have concluded that the English long-horns sprung from some of the Irish ones who were arrested in different parts of their journey. Others, however, and we think with more reason, finding the middle-horns in every mountainous and unfrequented part of the country, and the long-horns inhabiting the lower and more thickly inhabited districts, regard the first as the pure native breed, and consider the other to have been a stranger race, and introduced, probably from Lancashire, where a breed of cattle of the same character and form is found.

However this may be, there was a variety of circumstances which rendered the march of improvement much more rapid in England than in Ireland. While the British long-horns had materially improved, those in Ireland, owing to the depressed state of the peasantry, their proverbial indolence in these matters, and the law of gavel-kind,* which, by the division of even the smallest portion of land among all the children, produced a too numerous class of embarrassed and starving tenants or little landholders, had not progressed in the slightest degree.

More than a century ago, some zealous agriculturists in Meath commenced the work of improvement. Mr. Waller introduced some of the old Lancashires, a few of which long remained in Allenstown. Sixty years afterwards, a namesake and successor of his brought over one of the new Leicester breed. He permitted his neighbours and tenants to have the almost unrestrained use of him, and there was scarcely a cottager within three or four miles of Allenstown, that did not possess a cow displaying some traces of the Leicestershire blood. Mr. Lowther, the Earl of Bective, and Mr. Noble, successively contributed to the improvement of the breed in this part of Ireland.

About the same time, Lord Massarene introduced some fine long-horned cattle into Antrim; in 1775, Mr. Lesly, of Lesly-hill, imported one of Mr. Bakewell's bulls, and the cattle of the neighbouring country was materially and rapidly improved. The Marquis of Donegal imported another true Leicester from the stock of Mr. Astley. Mr. Watson, of Broshill, likewise diligently crossed the country cows with a valuable Leicester bull.

Lord Farnham was zealously employed in improving the cattle of Cavan, but he was long opposed by the not unfounded apprehensions of the cottagers and small farmers. It was soon evident that he was able to fatten his cattle on less ground and poorer pasture than he could before, and raise them to a much greater weight; but it was also plain, that in proportion as he gave this disposition to fatten, he lessened the quantity of milk, which the cottager could ill spare: thence arose a prejudice against improvement altogether, and which was not surmounted without considerable difficulty.

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*Mr. Ross, in his Survey of Londonderry, gives an interesting account of this custom of gavel-kind and its pernicious effects. 'One great obstacle to improvement, and which is too general in Ireland, is their notion of the equal and unalienable right of all their children to the inheritance of their father's property, whether land or goods. This opinion, so just and reasonable in theory, but so ruinous and absurd in practice, is interwoven in such a manner in the very constitution of their minds, that it is next to impossible to eradicate it. In spite of every argument, the smaller Irish landholders continue to divide their farms among their children, and these divide on until division is no longer practicable; and in the course of two or three generations, the most thriving family must necessarily go to ruin.

'I knew a respectable farmer who held about thirty acres of arable land, in one of the mountain town-lands, and had two sons, between whom, according to custom, he equally divided his farm, which was thus barely able to support them and their families. One of these had himself four sons, among whom, during his lifetime, he also divided his fifteen acres, reserving to himself an equal share. Here then were five persons with three acres apiece; and as each of the sons, considering himself at once an established landholder, immediately married, there were five of the poorest and most wretched families that can be well imagined, without scope for their industry, trade or manufacture to employ them, or land sufficient to produce for them the common necessaries of life.

'Landlords blindly encourage this to increase their political influence. If the farm had been bequeathed to one of the sons, and the others had been taught some useful trade, and a little sum of money given to them to set up with, all might have been respectable and happy.'

In Langford the cattle were much improved by the exertions of the late Earl of Rosse, who imported several bulls of the best English breeds, and brought them to his highly cultivated demesne at Newcastle. On May 21, 1802, 10 six-years-old bullocks were sold at the fair of Ballymahoe for 400 guineas, and 10 four-years-old heifers for 300 guineas. These cattle were the property of Lord Oxmantown, (afterwards Earl of Rosse) and for size, shape, and fatness, could not be excelled. They were all fed on common hay and grass.

In Clare, Sir Edward O'Brien and Mr. Doxon of Fountain, Mr. Molony of Kiltannon, and Mr. Blood of Riverston, did much to render the breed more valuable; by the importation of the improved Leicesters. In Roscommon, the Messrs. Finch were particularly active in introducing the Lancashire, Leicestershire, and Warwickshire cattle.

Almost every county and barony of Ireland had its zealous and successful improver of the native breed, until, in the richer and more cultivated districts, the cattle became of as great a size and as perfect form as any which midland districts of England could produce.

There were, however, either two distinct breeds of long-horns, the one capable of rapid improvement, while the other, in a manner, set at defiance every means to add to the size, or give a tendency to early maturity, or there were found too great a proportion of agriculturists who obstinately refused to adopt the proper means for the amelioration of their stock; or there were many districts into which the improved long-horns rarely, or to a very inconsiderable degree, penetrated. From one or all of these causes it happened, that there are at the present moment two kinds of these cattle in Ireland, in character essentially different; the larger, which we have described, and a smaller, prevailing principally in the north of the island. At first view, perhaps, these would appear to be the same cattle, only smaller from poor keep and bad management; but their horns, long out of all proportion, their clumsy heads, large bones and thick hides, their bulkiness of dewlap contrasted with their lightness of carcass, in fine, an accumulation of defects about them, clearly mark them as being of far inferior value.

Thousands of them, and more perhaps than of the improved breed, find their way to the midland counties of England, in order that some attempt may be made to prepare them for the metropolitan market. The purchase of them is quite a lottery, or demands great skill and experience. Occasionally they will thrive to a degree not much inferior to the Welsh cattle, while at other times a lot of them may be put on as good fattening pasture as any in England, and be continued there the whole of the summer, consuming almost as much food as the largest oxen, and yet scarcely improving in condition.

In process of time, the English long-horns, although of the improved Bakewell breed, began to lose ground even in their native country; or rather a rival with somewhat higher pretensions appeared in the field. The improved short-horns began to attract the attention of the breeder; and their propensity to fatten, and the comparatively earlier period at which they arrived at maturity, soon became evident. There were not wanting spirited agriculturists in Ireland, who quickly availed themselves of this new mode of improving the Hibernian cattle. Sir Henry Vane Tempest was one of the first who introduced the short-horn bull. The improvement effected by the first cross was immediately evident in the early maturity of the progeny. The pure short-horn, or this cross with the long-horn, weighed as much at three years old as the pure long-horn used to do at five. But the breed rapidly degenerated, and it perhaps must be confessed that the first experiment in a great degree failed, and particularly as it was found that while the cattle bred back to the native Irish character, they never fully regained their hardihood, or their reputation as milkers.

It was likewise found that the pure Teeswater did not suit the ordinary management of cattle in Ireland. They answered only where the farmer had capital and quick return, and where he could house and feed them well. The Irish farmer had too much to alter in the system of treatment to which he and his forefathers had been accustomed; and he often had not the means to effect the requisite change, or if he had, his prejudices forbade him to use them.

The reputation of the short-horn, however, becoming more fully established in England, other attempts were made to introduce him into Ireland, and the experiments were more systematically conducted. Mr. Conolly of Castletown, to whom we are indebted for some valuable information, effected much improvement in Donegal. The pure short-horn was found too delicate for the severe weather and inferior food which they were destined to find in that mountainous district; but a half-bred stock was introduced, which improved the shape and increased the size of the Donegal cattle, and produced a better price. Mr. Conolly sent four bulls to his estates in that county, and they were highly approved. The prizes of the Farming Society of Donegal were adjudged to them, and their evident value has produced more attention to the care and feeding of cattle generally.

Mr. Walter tells us, that 'within the last ten years, the breed has been greatly improved by crossing with the Dutch, the Ayrshire, and the Durham; yet that the improvements are mostly confined to the gentlemen and large farmers, for the smaller farmers (who are the majority of the inhabitants) consider that the short-horns require too much care and feeding, and that their milk is not so good as that of the native breed.'

When speaking of the management of cattle in Wexford, Mr. Walker gives a faithful account of that which takes place over a great part of Ireland. 'The farms are small, and the occupiers of them have little capital; therefore, except in summer, when grass is plenty, the cattle live poorly and are exposed to hardships. For the same reason, the calves and young cattle are stinted in their growth; but this does not appear to injure their milking qualities. They generally go to the bull at a year, or a year and a half old, so that they come into the dairy at two, or rising three years old.

All cattle are here fed abroad on grass in the summer.* Some of the gentlemen and large farmers are beginning to cultivate mangel-wurzel and turnips, and to use hay; but the generality of the cattle are wintered on straw and potatoes, and many of them very imperfectly housed. They of course thrive better and afford a larger profit, where care is taken of them; but they are so hardy in constitution, as to yield a fair return under the common management.*

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* The Rev. A. Ross, in his 'Survey of Londonderry,' published in 1814, thus speaks of the mode of letting, and the cost of these summerings: 'The grazing of cattle is paid by the *summ*, by which is to be understood, the grazing of a cow when above three years old. The proportions of other kinds of cattle are estimated by this in the following manner:—A *summ* is divided into three equal parts called feet, which is thus applied. A year-old calf, is called a foot; a two-year old, two feet; a summ is three feet; a horse is five feet; two colts are equal to a horse; six sheep, or four ewes and four lambs, the same; 24 geese are a summ. Thus then, if 6s. be the price of a summ, a year old will be 2s., a two year

Mr. Anderson, of Shelton, in a letter with which we have been favoured from him at the request of the Earl of Wicklow, describes the old Irish cattle, there, as a low, broad, hardy breed, with thick heads and necks, and a thick hide. He says, that, 'the farmers run their cattle out nearly all the season, only taking them in in the evening, and then giving them a small quantity of hay. They are good dairy cows, but do not answer well for the grazier, as they do not fatten so well, and have more coarse meat than the improved breed. The average weight of the cows are from four to five hundred weight, (Mr. Walker states that the average weight of the Wexford cow is about 4½ cwt.)—but they might be greatly improved, if proper attention were paid to them; for the calves, after the two first weeks, are generally reared upon butter-milk, and then left to shift for themselves; only they have a little hay at night in winter.'

Mr. Anderson adds that 'the breed is considerably improved of late years, by crossing with the Durham and Ayrshire.' Lord Wicklow, whose stock consists almost entirely of the Durhams, much to his credit, gives his tenants the free use of his bulls without charge; and, encouraged by the improvement that has taken place, he purposes not only to continue, but to extend the system.

Soiling in the house is not much practised in this district; but grazing in the summer, and hay in the winter, constitute the mode of feeding; except that some of the graziers keep up part of their pasture for the fat cattle, which they retain at the end of the season. These run out in all weathers, and have cribs fixed in the field to give them hay in a stormy night, but they have no shed over them.

Lord Wicklow, who stall-feeds with turnips, mangel-wurzel, and potatoes, prefers the latter. The calves are reared on the cows, or have new milk given to them from the pail, and they are housed in winter, and fed on hay, with a few turnips or mangel-wurzel, each day.

Lord Dunally, in a letter with which we have been honoured from him, says, that 'in Tipperary he has kept the North Devon cattle for many years, and much approves of them for feeding, for the dairy, for working, and also for hardness, or quality to bear bad weather.

His Lordship states, that the usual weight of the native cattle, when fattened, is about five hundred pounds. He also gives a favourable account of the grazing properties of these cattle. He says, that 'they are often

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old 4*s*., a horse 10*s*., and so on. The charge for a summ in the mountains, from May to November, varies from 6*s*. to 16*s*., according to the goodness of the pasture. In the parks which are kept up for fattening, it is from 2*l*. to 2*l*. 10*s*.

* Mr. Rawson gives the following account of the strange privations to which the cattle are sometimes exposed. 'The droves of cattle when turned out are generally attended by a solitary herdsman and his boy, who are obliged to keep boundaries. Hay is never dreamed of as necessary; and in case of deep snow of long continuance, the bealing bullocks have nothing to resort to but coarse grass on undrained and unimproved moors and wet lands, which have scarcely been trodden on during the previous summer. Turnips, rape, or even straw are never thought of; nay, an extensive grazier would laugh at what he would call your folly, if you doubted the health of his bullocks on his coarse bogs. Houses or coverings of any kind are not thought of. Yet after all these severe trials of thriftiness, when at four years old, they are put to fatten about the 1st of May, and in five months are made fit for slaughter.'

brought to be fat without stall-feeding; and when upon good land, only require fodder with hay upon the ground for about three months, and without housing. They are, however, frequently housed, and fed with turnips and potatoes with good success.'

Mr. Moore O'Farrell speaks also of the great improvement effected in the Irish cattle within the last twelve years, by the importation of the Durham breed. He says, that 'they have displaced a cross of the long-horn Leicester on the Irish cow, and that the farmers of the country now prefer a cross of the Durham bull, on the Irish cow, to the pure breed, as being less delicate, and giving a richer and greater quantity of milk;' but he very properly adds, that 'the two first crosses are most approved of.'

Sir Robert Bateson, of Belvoir Park, Belfast, purchased in 1820, a bull and three cows, of Mr. Charles Howard of Melbourn, of the best short-horn breed, which succeed admirably in that district.

Mr. M'Neil, of Larn, in Antrim, tried a Highland bull, but the breed was not improved, either for the dairy or the butcher.

Perhaps there is no country in the world which, in proportion to its number of acres, contains so many cattle or possesses so extensive a trade in cattle and their produce, as Ireland does. In 1812, no less than 79,285 live oxen and cows were exported from Ireland, constituting full one-eighth part of the beef consumed in England, and stated to be of the *official* value of 439,128*l.* From that period, the number seemed to be gradually diminishing. In 1824, there were only 62,393 oxen and cows exported; in 1825, there were 63,524, and of the value of about 350,000*l.* No later details can be given, for the traffic between Britain and Ireland was then placed on the footing of a coasting trade: the numbers, however, were not, until lately, fewer than they were in 1825.

Before the establishment of steam navigation, many inconveniences and difficulties attended the transport of the Irish cattle. Many of them were driven a hundred or a hundred and fifty miles to the coast, where, if the wind was contrary, they were detained perhaps several days, with a very scanty allowance of food. They had none on the voyage; and when they arrived at the English shore, they were often in a starved state, and scarcely able to walk. This may be placed in another point of view. In a dry summer, the English fed cattle are sent to some of the markets, and particularly to those on the western coast, and especially Liverpool, to great disadvantage, From the scarcity of food and water, they do not arrive in a prime state of fatness; they have a long way to be driven, and are often badly supported on the road. In Ireland, they have had a capital summer for grazing, never wanting grass or water—and the finest long-horned cattle, a breed now almost extinct in this country, are sent over in the highest condition. Such is the facility of conveyance, that a steam-packet with a cargo of fat cattle will leave Ireland one day, and have them delivered and be cleared out in good time on the following day.

In addition to this transport of cattle for the graziers in England, Ireland supplies an immense quantity of beef, for the navy and merchants' vessels at all periods. During the late war, the cattle slaughtered at Cork for the use of the navy were, perhaps, more numerous than all that were disposed of in every other way, Mr. Cully saw at one fair at Ballinasloe, in Roscommon, 35,000 head of cattle, and half of them fat, all of which were bought up for slaughter at Cork.

Of the vexatious mode in which the business between the grazier and the contractor was often transacted, we subjoin in a note a somewhat humorous account, extracted from Dutton's Survey of the county of Clare:* we hope that the picture is not a little overcharged.

The perfect establishment of steam navigation, while it affords facilities for the transport of live-stock, yields still greater ones for the carriage of the carcass; and cattle may now be slaughtered in the evening at any of the ports on the eastern coast of Ireland, and sent to Liverpool, and by means of the railway, even to Manchester in time for the morrow's market.

We have stated that the old breed of Irish cattle is most valued for the dairy. They give, in proportion to their size, a much greater quantity of milk than the long-horns, and richer in butter. A cow is supposed to yield from 84lbs. to 112lbs. of butter in the year; a very good cow will yield 1½cwt. about half of which is consumed by the family, or in the country, and the remainder is exported to England. Carlow has the reputation of producing the best butter; but the firkins containing that which is manufactured in all the surrounding counties are often branded with the name of Carlow. It is highly esteemed in London and is often sold for Cambridge butter; but much of the Irish butter is very salt, and sometimes smoky and tallowy. In fact, there are three distinct sorts of butter in the Irish market. The best is sent to Dublin and to England; and from the latter country, exported to the East and West Indies. An inferior sort finds a market in Spain; and an inferior still, used to be sent to Boulogne. In Cork, the half Holderness breed is chiefly used for the dairy. The principal dairy counties are—Carlow, Cork, Fermanagh, Krery, Leitrim, Longford, Sligo, Waterford and Westmeath.

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* When the merchants are combined, the graziers are completely at their mercy, and suffer, not only every kind of gross indignity of treatment from these great men, but serious losses from the cheating of every person concerned in slaughtering these cattle. As it is scarcely known in other parts of the kingdom it may be at least amusing to detail the business a little. The grazier finding no agent attending the fairs to buy, except some trusty friend of the merchants, who reads a letter from Cork or Limerick stating the rumours of a peace or the expected very low price, is obliged to drive his cattle to either of these markets.

After driving them into either of these towns, he waits upon the great man, and with all humility, begs to know if he wants any fat cattle; after a good deal of pretended hurry of business, and waiting for a repetition of the question, 'he believes he shall not want any thing more than what he has already engaged, but to oblige Mr. ———, he will endeavour to make room for them; as to the price, it is to be regulated by what the other graziers receive.'

When this is settled, he must drive his beasts to a slaughter house, many of which are erected for this purpose. He pays for this a high price, and must give also the heads and offal. He must set up all night, superintending the slaughtering, and must silently observe every species of fraud committed by the very worst kind of butchers; for, as has frequently happened; if resentful language is used to those scoundrels they begin to whet their knives and put themselves in an assassinating attitude. This in a slaughtering-house at night and amongst the horrid scene of carnage around him, requires no small share of nerve.

Next morning, without taking any rest, he must bring his meat to the cutters up; here, unless they are feed, begins the second part of the fraud he has to suffer. First, they take for their perquisites several pounds of his best beef; and if he has cows, unless they are well paid, will cut away large quantities of the udder, which they call offal, and which is the property of the merchant, though he pays nothing for it. The merchant also gets the tongues; and if, perhaps, the grazier wants a few, must buy them at the rate of three shillings each.

The third scene begins at the scales: here another perquisite must be paid, and much good meat is refused, because, truly, it should be a few pounds less than the stipulated weight per beast.

An appeal is then made to the great man,—'he is gone out,'—'he won't be home to-night,'—'he is so busy he can't be seen;' at length, perhaps he is visible, and when matters are explained—'Really, Sir, I do not wish to take your cattle; the prices I receive in England are so low, I shall lose by my contract: suppose you would try if you could do better elsewhere; but I will agree to take your beef, though below the weight, if you make the terms lower.' The grazier has now no redress, and must agree to any terms. The business does not end here. Then he enquires what mode of payment; bills at ninety one days are the best terms he can get. He then applies to a chandler to buy his fat. When this is settled, the tanner must be waited on, and here as well as with the chandler, bills at a long date are the only payment he can receive; and as they are generally men of small or no capital, if their speculations should not succeed, their bills are worth little.

This is but a small part of the gross indignities the grazier has to suffer. He has to transact a business totally foreign to his habits of life, consequently unable to cope with those, who from their infancy, are used to the tricks practised in this business, and, therefore, able to avoid them, or turn them, perhaps, to their own benefit. The price depends not only on the causes before-mentioned, but on the size of the beast—those of a large size bringing more per cwt. than those of a smaller one, which is a premium on large bone; and cows are always lower in price than oxen, though they are sent to England in the same packages; and, if fat, go as the best beef, called planter's mess.

Very little cheese is made in Ireland, and that is of an inferior quality.

CHAPTER VI.

THE LONG HORNS.

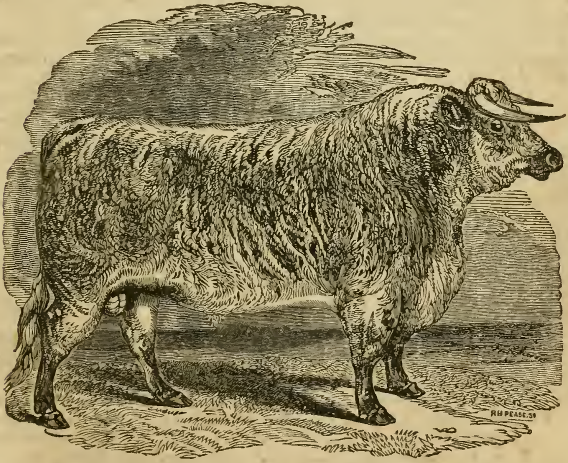
In the district of Craven, a fertile corner of the West Riding of Yorkshire bordering on Lancashire, and separated from Westmoreland chiefly by the western moorlands, there has been, from the earliest records of British agriculture, a peculiar and valuable breed of cattle. They were distinguished from the home-breds of other counties, by a disproportionate and frequently unbecoming length of horn. In the old breed this horn frequently projected nearly horizontally on either side, but as the cattle were improved the horn assumed other directions; it hung down so that the animal could scarcely graze, or it curved so as to threaten to meet before the muzzle, and so also to prevent the beast from grazing; or immediately under the jaw, and so to lock the lower jaw; or the points presented themselves against the bones of the nose and face, threatening to perforate them. We have given a similar description of the improved Irish breed. In proportion as the breed became improved the horns lengthened, and they are characteristically distinguished by the name of 'The Long Horns.' The cut of the Irish cattle in page 181, will give no unfaithful representation of their general appearance and form. Cattle of a similar description were found in the districts of Lancashire bordering on Craven, and also in the south-eastern parts of Westmoreland; but tradition in both of these districts pointed to Craven as the original habitation of the long-horn breed. If there gradually arose any difference between them, it was that the Craven beasts were the broadest in the chine, the shortest, the handsomest, and the quickest feeders; the Lancashire ones were larger, longer in the quarters, but with a fall behind the shoulders, and not so level on the chine.

Whence these cattle were derived was and still is a disputed point. Our opinion of this matter has been already expressed when treating of the Irish cattle.

The long horns seem to have first appeared in Craven, and gradually to have spread along the western coast, and to have occupied almost exclusively the midland counties.

There are, as in Ireland, two distinct breeds; the smaller Cravens inhabiting the mountains and moorlands, hardy, useful, valued by the cottager and little farmer on account of the cheapness with which they are kept, the superior quantity and excellent quality of the milk which they yield, and the aptitude with which they fatten when removed to better pasture. The larger Cravens, occupying a more level and richer pasture, are fair milkers, although in proportion to their size not equal to the others; but possess a tendency to fatten and acquire extraordinary bulk scarcely inferior to that of short-horns of the present day.

As either of these found their way to other districts, they mingled to a greater or less degree with the native cattle, or they felt the influence of change of climate and soil, and gradually adapted themselves to their new situation; and each assumed a peculiarity of form which characterised it as belonging to a certain district, and rendered it valuable and almost perfect there. The Cheshire, the Derbyshire, the Nottinghamshire, the Staffordshire, the Oxfordshire, and the Wiltshire cattle were all essentially long-horns, but each had its distinguishing feature, which seemed best to fit it for its situation, and the purposes for which it was bred. Having assumed a decided character, varying only with peculiar local circumstances, the old long-horns, like the Devons, the Herefords, and the Scotch, continued nearly the same. There is no authentic detail of their distinguishing points. Mr. Culley says that 'the kind of cattle most esteemed before Mr. Bakewell's time were the large, long-bodied, big-boned, coarse, flat-sided kind, and often lyery or black-fleshed.' This, however, is rather too severe a censure on the Cravens or Lancashire beasts of that day. From hints given by old writers, we may conclude that some of them at least were characterized by their roundness and length of carcass, coarseness of bone, thickness and yet mellowness of hide, and the rich quality although not abundant quantity of their milk.



[*Old Craven Bull.*]

The foregoing cut contains the portrait of a Craven bull of the present day, but supposed to bear about him many of the characters of the old breed. He was drawn by Mr. Harvey as he stood in Smithfield market.

Here were evident materials for some skilful breeder to work upon; a connexion of excellences and defects by no means inseparable. That which was good might be rendered more valuable, and the alloy might be easily thrown off. It was not, however, until about the year 1720 that any agriculturist seemed to possess sufficient science and spirit to attempt the work of improvement in good earnest. A blacksmith and farrier, of Linton, in Derbyshire, on the very borders of Leicestershire, who at the same time rented a little farm, has the honour of standing first on the list. His name was Welby. He had a valuable breed of cows, which came from Drakelow house, a seat of Sir Thomas Gresley, on the banks of the Trent, about a mile from Burton. He prided himself much in them, and they deserved the care which he took in improving them and keeping the breed pure; but a disease, which defied all remedial measures then known, broke out and carried off the greater part of them, thus half ruining Welby, and putting a final stop to his speculations.

Soon after this Mr. Webster, of Canley, near Coventry, distinguished himself as a breeder. He too worked upon Sir Thomas Gresley's stock, some of whose cows he brought with him when he first settled at Canley. He was at considerable trouble in procuring bulls from Lancashire and Westmoreland, and he is said to have had the best stock of cattle then known. One of his admirers says that 'he possessed the best stock, especially of *beace*, that ever were, or ever will be bred in the kingdom.' This is high praise, and is recorded as evidence of the excellent quality of Mr. Webster's breed.

It is much to be regretted that we have such meagre accounts of the proceedings of the early improvers of cattle. Little more is known of Mr. Webster than that he established the Canley breed, some portion of whose blood flowed in every improved long-horn beast.

The bull, BLOXEDGE, the HUBBACK of the long horns, and, like him, indebted to accident for the discovery of his value, was out of a three-year old heifer of Mr. Webster's, by a Lancashire bull, belonging to a neighbour. When a yearling he was so unpromising that he was discarded and sold to a person of the name of Bloxedge, (hence the name of the beast,) but turning out a remarkably good stock-getter, Mr. Webster re-purchased him, and used him for several seasons. He was afterwards sold to Mr. Hanison, of Deakenedge, in Warwickshire, and Mr. Flavel, of Hogshill, where he died.

Now appeared the chief improver of the long-horns, and to whom his cotemporaries and posterity have adjudged the merit of creating as it were a new breed of cattle. It is a disgrace to the agriculture of the times that Bakewell should have been suffered to pass away without some authentic record of what he effected, and the principles that guided him, and the means by which his objects were accomplished.

The only memoir we have of Robert Bakewell is a fugitive paper in the Gentlman's Magazine, from which every writer has borrowed, and his obligation to such a source none has condescended to acknowledge. It tells us that Robert Bakewell was born at Dishley, in Leicestershire, about 1725. His father and grandfather had resided on the same estate. Having remarked that domestic animals in general produced others possessing qualities nearly similar to their own, he conceived that he had only to select from the most valuable breeds, such as promised to return the greatest possible emolument to the breeder, and that he should then be able, by careful attention to progressive improvement, to produce a breed whence he could derive a maximum of advantage.

Under the influence of this excellent notion, he made excursions into different parts of England, in order to inspect the different breeds, and to select those that were best adapted to his purpose, and the most valuable of their kind; and his residence and his early habits disposed him to give the preference to the long-horn cattle.

We have no account of the precise principles which guided him, nor of the motives that influenced him in the various selections which he made; but Mr. Marshall, who says that he 'was repeatedly favoured with opportunities of making ample observations on Mr. Bakewell's practice, and with liberal communications from him on all rural subjects,' gives us some clue. He tells us, however, that 'it is not his intention to deal out Mr. Bakewell's private opinions, or even to attempt a recital of his particular practice.' Mr. Marshall was doubtless influenced by an honourable motive in withholding so much that would have been highly valuable; and we can only regret that he was so situated as to have this motive pressing upon his mind.

He speaks of the general principles of breeding, and when he does this in connexion with the name of Bakewell, we shall not be very wrong in concluding that these were the principles by which that great agriculturist was influenced.

'The most general principle,' he says, (we are referring to his 'Economy of the Midland Counties,' vol. i. p. 297) 'is beauty of form. It is observable, however, that this principle was more closely attended to at the outset of improvement (under an idea in some degree falsely grounded, that the beauty of form and utility are inseparable) than at present, when men who have long been conversant in practice make a distinction between a 'useful sort' and a sort which is merely 'handsome.'

'The next principle attended to is a proportion of parts, or what may be called *utility* of form in distinction from *beauty* of form; thus the parts which are deemed *offal*, or which bear an inferior price at market, should be small in proportion to the better parts.

'A third principle of improvement is the texture of the muscular parts, or what is termed *flesh*, a quality of live stock which, familiar as it may long have been to the butcher and the consumer, had not been sufficiently attended to by breeders, whatever it might have been by graziers. This principle involved the fact that the grain of the meat depended wholly on the *breed*, and not, as had been before considered, on the size of the animal. But the principle which engrossed the greatest share of attention, and which, above all others, is entitled to the *grazier's* attention, is *fattening quality*, or a natural propensity to acquire a state of fatness at an early age, and when in full keep, and in a short space of time; a quality which is clearly found to be hereditary.'

Therefore, in Bakewell's opinion, every thing depended on breed, and the beauty and utility of the form, the quality of the flesh and the propensity to fatness, were, in the offspring, the natural consequence of similar qualities in the parents. His whole attention was centered in these four points; and he never forgot that they were compatible with each other, and might be occasionally found united in the same individual.

Improvement had hitherto been attempted to be produced by selecting females from the native stock of the country, and crossing them with males of an alien breed. Mr. Bakewell's good sense led him to imagine that the object might be better accomplished by uniting the superior branches of the same breed, than by any mixture of foreign ones.

On this new and judicious principle he started. He purchased two long-horn heifers from Mr. Webster, and he procured a promising long-horn bull from Westmoreland. To these and their progeny he confined himself; coupling them as he thought he could best increase, or establish some excellent point, or speedily and effectually remove a faulty one.

As his stock increased, he was enabled to avoid the injurious and enervating consequence of breeding *too closely* 'in and in.' The breed was the same, but he could interpose a remove or two, between the members of of the same family. He could preserve all the excellences of the breed, without the danger of deterioration; and the rapidity of the improvement which he effected was only equalled by its extent.

Many years did not pass before his stock was unrivalled for the roundness of its form, and the smallness of its bone, and its aptitude to acquire external fat; while they were small consumers of food in proportion to their size; but at the same time, their qualities as milkers were very considerably lessened. The *grazier* could not too highly value the Dishley, or new Leicester long-horn, but the *dairyman*, and the *little farmer*, clung to the old breed as most useful for their purpose.

Mr. Bakewell had many prejudices opposed to him, and many difficulties to surmount, and it is not therefore to be wondered at if he was more than once involved in considerable embarrassment; but he lived to see the perfect success of his undertaking.*

He died when verging on his seventieth year. His countenance bespoke activity, and a high degree of benevolence. His manners were frank and pleasing, and well calculated to maintain the extensive popularity he had acquired. His hospitality to strangers was bounded only by his means.

Many anecdotes are related of his humanity towards the various tribes of animals under his management. He would not suffer the slightest act of cruelty to be perpetrated by any of his servants, and he sternly deprecated the barbarities practised by butchers and drovers; showing, by examples on his own farm, the most pleasing instances of docility in every animal.†

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* In that pleasing and instructive work, 'Illustrations of Natural History,' we find the following ingenious, but too severe criticism, on Bakewell's system. 'It was his grand maxim, that the bones of an animal intended for food could not be too small, and that the fat being the most valuable part of the carcass, it should consequently not be too abundant. In pursuance of this leading theory, by inducing a preternatural smallness of bone, and rotundity of carcass, he sought to cover the bones of all his animals externally with masses of fat. Thus, the entirely new Leicester breed, from their excessive tendency to fatten, produce too small a quantity of eatable meat, and that, too, necessarily of inferior flavour and quality. They are in general found defective in weight, proportionably to their bulk, and if not thoroughly fattened, their flesh is crude and without flavour; while if they be so, their carcasses produce little else but fat, a very considerable part of which must be sold at an inferior price, to make candles instead of food, not to forget the very great waste that must ever attend the consumption of over-fattened meat.

This great and sagacious improver, very justly digusted at the sight of those huge, gaunt, leggy, and misshapen animals with which his vicinity abounded, and which scarcely any length of time or quantity of food would thoroughly fatten, patriotically determined upon raising a more sightly and a more profitable breed; yet, rather unfortunately, his zeal impelled him to the opposite extreme. Having painfully, and at much cost, raised a variety of cattle, the chief merit of which is to make fat, he has apparently laid his disciples and successors under the necessity of substituting another that will make lean.'—p. 5—8.

† The writer in the 'Gentleman's Magazine,' to whom we have before referred, says that 'the gentleness of the different breeds of cattle could not escape the attention of any

Mr. Bakewell's celebrated bull Twopenny was the produce of the Westmoreland bull, out of old Comely, who has one of the two heifers purchased from Mr. Webster; therefore he was, by the side of his dam, a direct descendant of the Canley blood.

Mr. Bakewell had afterwards a more valuable bull than this, named D. He retained him principally for his own use, except that he was let for part of a season to Mr. Fowler, and that a few cows were brought to him at five guineas a cow. He was got by a son of Twopenny, out of a daughter and sister of the same bull, she being the produce of his own dam. The method of *rearing* the young, as practised by Mr. Bakewell, was not very different from that now in use. 'The calves sucked for a week or a fornight, according to their strength; new milk in the pail was then given a few meals; next, new milk and skim-milk mixed, a few meals more; then skim-milk alone, or porridge made with milk, water, ground oats, &c., and sometimes oil-cake, until cheese-making commenced, if it was a dairy farm; after which, whey porridge, or sweet whey in the field, being careful to house them in the night until the warm weather was confirmed. Bull calves, and high-bred heifers, however, were suffered to remain at the teat until they were six, nine, or perhaps twelve months old, letting them run with their dams, or more frequently less valuable cows or heifers.'*

Starting a few years afterwards, and rivalling Mr. Bakewell in the value of his cattle, was Mr. Fowler of Rollwright, in Oxfordshire, on the borders of Warwickshire. His cows were also of the Canley breed; most of them having been purchased from Mr. Bakewell; and his bull Shakspeare, the best stock-getter that the long-horn breed ever possessed, was got by D, out of a daughter of Twopenny, and therefore of pure Canley blood.

Mr. Marshall gives the following description of this bull, and a very interesting and instructive one it is. It is a beautiful explication of some of the grand principles of breeding. 'This bull is a striking specimen of what naturalists term *accidental varieties.* Though bred in the manner

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observer. It seemed to run through them all. At an age when most of his brethren are either foaming or bellowing with rage and madness, old C, a bull, a son of the old parent Comely, had all the gentleness of a lamb, both in his look and action. He would lick the hand of his feeder; and if any one patted or scratched him, he would bow himself down almost on his knees.'

The same writer describes Mr. Bakewell's servants, one of whom had been with him 20 years, and another 32, and another 40 years. He likewise gives a curious account of Mr. Bakewell's hall. 'The separate joints and points of each of the more celebrated of his cattle were preserved in pickle, or hung up side by side; showing the thickness of the flesh and external fat on each, and the smallness of the offal. There were also skeletons of the different breeds, that they might be compared with each other, and the comparative difference marked. Some joints of beef, the relics of old Comely, the mother of the stock, and who was slaughtered when her existence had become burdensome to her, were particularly remarked. The fat of the sirloin on the outside was four inches in thickness.'

Mr. Young, in his Eastern Tour, gives the following account of Mr. Bakewell's management of the cattle—'Another peculiarity is the amazing gentleness in which he brings up these animals. All his bulls stand still in the field to be examined: the way of driving them from one field to another, or home, is by a little switch: he or his men walk by their side, and guide them with the stick wherever they please; and they are accustomed to this method from being calves. A lad, with a stick three feet long, and as big as his finger, will conduct a bull away from other bulls, and his cows, from one end of the farm to the other. All this gentleness is merely the effect of management; and the mischief often done by bulls is undoubtedly owing to practices very contrary, or else to a total neglect.'

* Marshall's Midland Counties, vol. i. p. 358.

that has been mentioned, he scarcely inherits a single point of the long-horned breed, his horns excepted. When I saw him in 1784, then six years old, and somewhat below his usual condition, though by no means low in flesh, he was of this description.

'His head, chap and neck remarkably fine and clean; his chest extraordinarily deep—his brisket down to his knees. His chine thin, and rising above the shoulder points, leaving a hollow on each side behind them. His loin, of course, narrow at the chine; but remarkably wide at the hips, which protuberate in a singular manner. His quarters long in reality, but in appearance short; occasioned by a singular formation of the rump. At first sight it appears as if the tail, which stands *forward*, had been severed from the vertebræ by the chop of a cleaver, one of the vertebræ extracted, and the tail forced up to make good the joint; an appearance, which, on examining, is occasioned by some remarkable wreaths of fat formed round the setting on of the tail; a circumstance which in a picture would be deemed a *deformity*, but as a *point* is in the highest estimation. The round bones snug, but the thighs rather full and remarkably let down. The legs short and their bone fine. The carcass, throughout, (the chine excepted) large, roomy, deep, and well spread.

'His horns apart, he had every point of a Holderness or a Teeswater bull.* Could his horns have been changed, he would have passed in Yorkshire as an ordinary bull of either of those breeds. His two ends would have been thought tolerably good, but his middle very deficient; and I am of opinion, that had he been put to cows of those breeds, his stock would have been of a moderate quality; but being put to cows deficient where he was full, (the lower part of the thigh excepted,) and full where he was deficient, he has raised the long-horned breed to a degree of perfection, which without so extraordinary a prodigy they never might have reached.'

No wonder that a form so uncommon should strike the improvers of this breed of stock, or that points they had been so long striving in vain to produce, should be rated at a high price. His owner was the first to estimate his worth, and could never be induced to part with him except to Mr. Princep, who hired him for two seasons, at the unusual price of eighty guineas a season. He covered until he was ten years old, but then, although otherwise healthy, he became paralytic in his hind quarters, and consequently, useless. His sire, D, at the age of 12 or 13, was more active than bulls usually are at three or four years old.

At a public sale of Mr. Fowler's cattle, 1791, the following prices were given for some of the favorite beasts. This a sufficient proof of the estimation in which the improved Leicesters were now beginning to be held.

BULLS.	£.	s.	d.
Garrick, five years old	250	0	0
Sultan, two years old	230	0	0
Washington, do.	215	0	0
A, by Garrick, one year old	157	0	0
Young Sultan, do.	210	0	0
E, by Garrick, do.	152	0	0

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* This may be true, according to the character of the short-horns at that time, but Shakspeare does not so strictly resemble them in their present improved state.

COWS.

	£.	s,	d.
Brindled Beauty, by Shakspeare	273	0	0
Sister to Garrick	120	0	0
Nell, by do.	136	0	0
Young Nell, by brother of do,	126	0	0
Black Heifer	141	0	0
Dam of Washington	194	0	0
Fifty breed of cattle produced*	4289	4	6

Another improver of the long-horns deserves mention before we proceed, and that is Mr. Princep of Croxall, in Derbyshire, He was supposed at that time, to have the best dairy of long-horn cows in the whole of the midland counties. He originally bred them from a cow of the name of Bright, who was got by Mr. Webster's Bloxedge, the father of the Canley blood, and he much improved his breed through the medium of Shakspeare, which, as we have just stated, he hired of Mr. Fowler for two successive seasons. It was remarked, that every cow and heifer of the Shakspeare blood could be recognized at first sight as a descendant of his.†

Mr. Paget of Ibstock, in Leicestershire, should be added to the list of the improvers of the long-horns. His cattle were of the purest of the Rollwright blood, and consequently of the Canley stock.

Mr. Mundy of Derby must not be forgotten, whose cattle, although not so large as some of the improved Leicesters, were excelled by none in beauty of form or aptitude to fatten‡: and, last of all, mention should be made of Mr. Astley, whose breed, larger than Mr. Mundy's, but seldom so heavy as Mr. Princep's, were much admired.

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* Mr. Fowler used to conduct his business on the old principle of selling. Mr. Marshall says that Mr. Coke of Norfolk used to have all the cow calves he could spare at ten guineas each, taking them when young; and in 1789, Mr. Fowler had ten bull-calves, for which he refused 500 guineas. The practice of letting bulls originated in this district; and chiefly with Mr. Bakewell, and was generally adopted. The bulls were sent out in April or the beginning of May, and were returned in August. The prices varied from ten to fifty or sixty pounds; but in one case, as we have just stated, a bull, (Mr. Fowler's Shakspeare) was let at eighty guineas a season.

Some inconvenience occasionally resulted from this; and a bull that appeared a very desirable one in the show-yard was now and then returned, long before his season was over, not only as deficient in some material point, but as absolutely useless. Mr. Marshall very ingeniously accounts for this: he says that 'the breeders object is to render his bull, to the eye at least, as near perfection as may be; he is therefore made up for the show by high keep, as well to evince his propensity to fatten as to hide his defects. thereby showing him off to the best advantage; the consequence of which is, that being taken from this high keep, and lowered at once to a common cow-pasture, he flags. Hence it is become a practice of judicious breeders, when their bulls are let early enough to lower them down by degrees to ordinary keep, previous to the season of employment.

† Mr. Parkinson says, 'One of the greatest excellences in Mr. Princep's cattle, is their length, with smallness in their shoulders, giving so many fine cuts along their upper parts. Mr. Princep's cows are remarkably fat, so much so, I think, that if half a dozen of them were put in at the Smithfield show in their milking state, there would be very few of the cattle exhibited and made up for that purpose that would equally attract the eyes of the public.' Vol. i. p. 154.

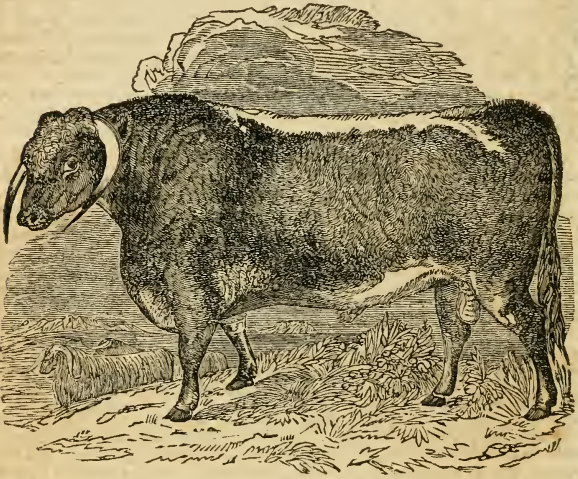
We learn from the same authority, that Mr. Princep was bid 500 guineas for a two-years old bull, and thirty (another account says fifty) guineas a cow for the use of his best bull to thirty cows, vol. i. p. 102. He was also offered 2000*l*. for twenty dairy cows. A four year old steer of Mr. Princep's breed, weighed 248 stones of 14lbs. to the stone, (424 stones Smithfield weight, or 3472 lbs.) In addition to this, there were 350lbs. of fat, and the hide weighed 177lbs.

Another of Mr. Princep's oxen was fed by the Marquis of Donegal in 1794. The four quarters weighed 1988 lbs., the tallow 200 lbs. and the hide 177 lbs.

‡ Mr. Parkinson bears the following testimony to the superiority of the new cattle, even at this early period. He is speaking of Mr. Mundy. 'There was one thing which prejudiced my mind much in favour of Mr. Mundy's cattle, viz., it was in the month of September that I visited his farm, and his park lying very conveniently situated for the

And now we may inquire, a little more particularly, what was the result of all these combined efforts? Was a breed produced worthy of the talents and zeal of all these skilful agriculturists? On the Leicestershire cattle, and in particular districts in the neighbouring counties, the change was great and advantageous so far as the grazing and fattening, and especially the early maturity of the animals, were concerned.

We present our readers with the following two cuts of the improved Leicesters.



[*New Leicester Bull.*]

This cut and the following one, are taken from Garrard's beautiful engravings of British oxen. Both the bull and the cow were of the pure Dishley breed, and were the property of Mr. Honeybourn, Mr. Bakewell's nephew and successor.

What is now become of this improved long-horn breed? Where is it to be found? It was a bold ānd a successful experiment. It seemed for a while to answer the most sanguine expectation of these scientific and

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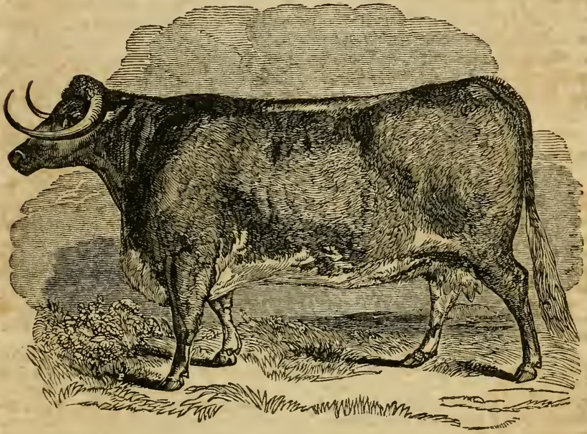
inhabitants of Derby, he permits them to pasture their cows in it. I think the number seemed to be about eighty; and as they probably belonged to half as many different people, without doubt bought of jobbers cow by cow and from various parts of the kingdom, it seems almost impossible that the whole mass of these cows could be selected of a bad kind; and as many of them had grazed in the park all the summer, they had had a sufficient time to fatten, yet there was not a single cow in the whole number that had the least pretensions to fat; while Mr. Mundy had some of his own cows pasturing among them, many of which were fatter than any single cow could be found on some market days in Smithfield. I do not know,' he adds, 'that a better trial, as an experiment, could be made, to show the superior value of Mr. Mundy's cattle.' These cows could not be very deficient at the pail, for one of Mr. Mundy's gave fourteen pounds of butter in one week.

spirited breeders. In the districts in which the experiments were carried on, it established a breed of cattle equalled by few, and excelled by none but the Herefords. It enabled the long-horns to contend, and often successfully, with the heaviest and best of the middle-horns. It did more; it improved, and that to a material degree, the whole breed of long-horns. The Lancashire, the Derbyshire, the Staffordshire cattle became, and still are an improved race; they got rid of a portion of their coarse bone. They began to gain their flesh and fat on the more profitable points. they acquired a somewhat earlier maturity, and, the process of improvement not being carried too far, the very dairy-cattle obtained a disposition to convert their aliment into milk while milk was wanted, and, after that, to use the same nutriment for the accumulation of flesh and fat. The midland counties will always have occasion to associate a feeling of respect and gratitude with the name of Bakewell. The Irish breeders owe every thing to the new Leicester cattle. A new stock, in fact, has arisen since the improved long-horns were grafted on the native Irish stock.



[*New Leicester Cow.*]

Mr. Marshall, to whom, for a reason that will presently be stated, we are compelled again to have recourse, thus describes the improved Leicesters in his own time, which was that of Bakewell, Princep, and Fowler.

'The *forend* long; but light to a degree of elegance. The neck thin, the chap clean, the head fine, but long and tapering.

'The *eye* large, bright and prominent.

'The *horns* vary with the sex, &c. Those of bulls are comparatively short, from fifteen inches to two feet; those of the few oxen that have been reared of this breed, are extremely large, being from two and a half to three and a half feet long; those of the cows nearly as long, but much finer, tapering to delicately fine points. Most of them hang downward by the side of the cheeks, and then, if well turned, as many of the cows are, shoot forward at the points.

'The *shoulders* remarkably fine and thin, as to bone; but thickly covered with flesh—not the smallest protuberance of bone discernible.*

'The *girth* small, compared with the short-horn and middle-horn breeds.†

'The *chine* remarkably full when fat, but hollow when low in condition.‡

'The *loin* broad, and the *hip* remarkably wide and protuberant.§

'The *quarters* long and level; the *nache* of a middle width, and the *tail* set on variously, even in individuals of the highest repute.‖

'The *round-bones* small, but the *thighs* in general fleshy; tapering, however, when in the best form toward the gambrels.

'The *legs* small and clean, but comparatively long.¶ The *feet* in general neat, and of the middle size.

'The *carcass* as nearly a cylinder, as the natural form of the animal will allow. The *ribs* standing out full from the spine. The *belly* small.**

'The *flesh* seldom fails of being of the first quality.

'The *hide* of a middle thickness.

'The *colour* various; the brindle, the finch-back, and the pye, are common. The *lighter* they are, the better they seem to be in esteem.††

'The *fattening* quality of this improved breed, in a state of maturity, is indisputably good.

'As *grazier's stock*, they undoubtedly rank high. The principle of the *utility of form* has been strictly attended to. The bone and offal are small, and the forend light; while the chine, the loin, the rump and the ribs are heavily loaded, and with flesh of the finest quality. In point of early maturity, they have also materially gained. In general, they have gained a year in preparation for the butcher; and although, perhaps not weighing so heavy as they did before, the little diminution of weight is abundantly compensated, by the superior excellence of the meat, its earlier readiness, and the smaller quantity of food consumed.

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* The Dishley breed excelled in this point. Some of the heifers had shoulders as fine as race-horses.

† Many of Mr. Fowler's breed, however, were very fairly let down in the girth.

‡ This is considered by accurate judges to be a criterion of good mellow flesh. The large hard ligaments, (the continuation of the ligaments of the neck, united with those of the vertebræ of the spine itself,) which in some individuals, when in low condition, stretch tightly along the chine, from the setting on of the neck to the fore part of the loins, is said to be a mark of the flesh being of a bad quality. They are only proofs of great strength in the spine, and, probably, in the animal generally; and indicating that the meat will be sinewy and tough.

§ A wide loin, with projections of fat on the hips, may be desirable; but there can be neither beauty nor use in the protuberance of the tuberosities of the bone. A full hip may be of advantage, but scarcely a protuberant one.

‖ The quarters of Shakspeare have been described. Those of the bull D. were not less remarkable, his tail appearing to grow out of the top of his spine, instead of being a continuation of the vertebræ; and the upper part of the tail forming an arch, which rose some inches above the general level of the back. This, viewing him as a picture, has a good effect; but as a point, is a very bad one for the grazier, as tending to hide the fatness of the rump. In this, and in many other points, the son and the sire are as dissimilar as if they had no consanguinity.

Mr. Parkinson relates an anecdote respecting the peculiar length of quarters, and length generally of these cattle. 'On my observing to Mr. Princep the remarkable length of his cattle, he said he was one day showing them to a gentleman, who, as the men were turning the best bull out of the house, exclaimed in astonishment "When will *all* your bull be out?" '—Parkinson on Live Stock, vol. i. p. 154.

¶ This, however, is more owing to the gauntness of the carcass, than to the actual length of the legs.

** The improvers of the long-horns have been in error, when they have considered this an excellence. The discussion of this point, however, will be advantageously deferred until we have considered the anatomy and proper form of oxen.

†† A light-coloured beast always appears to be larger than a dark-brown, or black one of equal weight; therefore, perhaps it is, that the lighter ones are preferred. There is a kind of optical deception in their favour; but, otherwise, if colour has any thing to do with the value of the animal, we should give the preference to a dark-coloured one, as indicating superior hardihood, and generally with equal mellowness of skin.

It is said that Mr. Webster's cows, the parents of the Canley breed, were red; and so were some of the best of Mr. Fowler's.

'As *dairy-stock*, their merit is less evident; or rather it does not admit of doubt that their milking qualities have been very much impaired.

'As *beasts of draught*, their general form renders them unfit; yet many of them are sufficiently powerful, and they are more active than some other breeds used for the plough, or on the road; but the horns generally form an insuperable objection to this use of them.'

But what is become of Bakewell's improved long-horn breed? A veil of mystery was thrown over most of his proceedings, which not even his friend Mr. Marshall was disposed to raise. The principle on which he seemed to act, breeding so completely 'in and in' was a novel, a bold, and a successful one. Some of the cattle to which we have referred were very extraordinary illustrations, not only of the harmlessness, but the manifest advantage of such a system; but he had a large stock on which to work; and no one knew his occasional deviations from this rule, nor his skilful interpositions of remoter affinities, when he saw or apprehended danger.

The truth of the matter is, that the master spirits of that day had no sooner disappeared, than the character of this breed began imperceptibly to change. It had acquired a delicacy of constitution, inconsistent with common management and keep; and it began slowly, but undeniably to deteriorate. Many of them had been bred to that degree of refinement, that the propagation of the species was not always certain.

In addition to this, a rival—a more powerful rival, appeared in the field. The improved short-horns began to occupy the banks of the Tees. They presented equal aptitude to fatten, and greater bulk and earlier maturity.

Westmoreland was the native land of the long-horns. Webster had brought thence the father of the Canley stock; and Bakewell had sought the father of his breed there: but even in Westmoreland the short-horns appeared; they spread; they established themselves; they, in a manner, superseded the long-horns. They found their way to southern districts; they mingled with the native breeds; a cross from them generally bestowed increase of milk, aptitude to fatten, and early maturity. It is true, that a frequent recourse to the short-horn was generally necessary in order to retain these advantages, but these advantages were bestowed, and might be retained, except in a few districts, and for some particular purposes. Thus they gradually established themselves every where; they were the grazing cattle of the large farmer and the gentleman, and another variety of them occupied the dairy. The benefits conferred by the improved long-horns remained, but the breed itself gradually diminished; in some places it almost disappeared; and at the present moment, and even in Leicestershire, the short-horns are fast driving the long-horns from the field. The reader may scarcely give credit to the assertion, but it is strictly true, that at the present moment (1833) there is not a single improved Leicester on the Dishley farm, and scarcely a half-horn. There are not a dozen pure Leicesters within a circuit of a dozen miles of Dishley. It would seem as if some strange convulsion of nature, or some murderous pestilence, had suddenly swept away the whole of this valuable breed.

Having thus endeavoured to do this breed of cattle the justice which it deserves, we will take a very rapid survey of the different counties which it formerly, or still occupies.

WESTMORELAND.

In the part of this county bordering on Lancashire and Yorkshire, and in the neighbourhood of Kirby Lonsdale, the long-horns used to exist in their greatest purity; but whether the farmers have suffered the best of their stock to be drawn away in order to keep up that of the midland counties, while the best of the Teeswater are brought into Westmoreland in return; or, whatever may have been the cause, the effect is undeniable, that the short-horns are establishing themselves, and the long-horns retrograding.

A vast number of Scotch cattle are grazed in Westmoreland. They are bought at Brough hill fair in the beginning of September; wintered on coarse pasture or in the straw yard; sent to the commons in May; and the foremost being put upon the best grounds, they are ready to journey farther south, or even to be killed for the Westmoreland consumption in October.

On the wastes there are many Scotch and also many of the native breed, (the smaller Cravens,) with which neither the heavier improved long-horns, nor the short-horns interfere.

In the better-cultivated parts of the country, the old and large long-horns are found; they are excellent feeders; they grow to a very considerable size, and lay their fat on the valuable parts.

LANCASHIRE.

In the southern part of this, the native county of the long-horns, that breed is now rarely seen in a pure state. In the neighbourhood of large towns, the Yorkshire milch cow is chiefly kept; for where the quantity of milk is regarded, no breed can vie with the Holderness.* Where butter is made, a cross between the long and the short-horn is preferred. These cattle are said to be more hardy, less liable to illness, and the milk of the short-horn progenitor is little diminished in quantity, while it acquires much of the peculiar richness of that which is given by the long-horn breed.

Even for grazing, the native breed is rarely seen; but at the annual meetings of the Manchester Agricultural Society, the short horns bear away the principal prizes, and in the centre of the county, although a premium was formerly offered for the best long-horn bull, not one has

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* The average quantity of milk, yielded by a good Holderness cow in the neighbourhood of Manchester, is about nine quarts per day. A good long-horn cow will yield about seven quarts. Mr. Stevenson, who published a Survey of Lancashire, in 1814 thus computes the expenses and returns of a milk farm, in the neighbourhood of Manchester. The farm to which he refers was under the management of Mr. Peter M'Niven; it contained 115½ Lancashire acres.

	£		£
Rent per annum . .	520	15 acres of oats at 15*l*. .	225
Taxes	84	20 ditto at 20*l*. . . .	400
Servants' wages . .	234	40 cows' milk at 12*l*. . .	480
Profit	267		
	1105		1105

been shown for the last three or four years. We are much indebted to that society and particularly to its indefatigable secretary Mr. Thomas Ashworth, for some valuable information respecting the present state of cattle in this part of Lancashire.

On the hills and moors some Welsh cattle are found, and also small long-horn beasts, whether Irish or home-bred, and mingled with crosses of every kind. A society has lately been established at Liverpool, which promises to be of essential service in benefitting the agricultural concerns of that district; and the example lately set by a few great landholders, and especially by the Earl of Derby, of keeping good bulls for the use of their tenantry, will speedily effect a considerable and very desirable alteration. If the old long-horn breed is, in a manner, gone here, something as valuable should be substituted; but as yet with the exception of the introduction of the Teeswater cattle, to the extent which we have stated, among the larger farmers and the Yorkshire cows among the milk dairies, there cannot be said to be any prevailing breed established in the southern part of Lancashire.

Mr. Bunnell, V. S. of Liverpool, assures us that in the neighbourhood of that town, very few cattle are *bred* for the purpose of grazing, and that those which are *fed* are chiefly confined to gentlemen's parks, and are principally Scotch Highland bullocks. To the same gentlemen we are indebted for the following account of the supply of the Liverpool market.

Weekly Average.

' 600	Irish beasts,	average about	6	cwt. of 120 lbs.
' 140	English do.	do.	6½	do.
' 60	Scotch do.	do.	5½	do.

' Of the cattle from Ireland, about twenty are short-horns; sixty of the long-horn Leicester breed, and the remainder of the old Irish breed, with the exception of a few Devons and Ayrshires.

' Of the English cattle, about one third are short-horns; one-third Cumberland long-horns; and one third Herefordshire and other breeds.

' Of the Scotch cattle, about one-eighth are short horns, and the rest Galloways and Highlanders, of various descriptions.'

Towards the middle of Lancashire, we find some zealous breeders of the short-horns. Mr. Almond, of Standish, is foremost amongst them, and his cattle bear off the bell, even amongst the most successful cultivators of this breed. The Earl of Wilton is a frequent competitor at the meetings of the Manchester society. In 1830, he exhibited the best yearling short-horn bull, and some very fine specimens of cows fattening after milking.

We meet with more of the long-horns, but they are principally of an inferior sort. Mr. Harrison, V. S. at Lancaster, thus expresses himself: ' Since the rage for short-horned cattle has commenced, and still goes on in this neighbourhood, the breed of the native long-horn has imperceptibly declined, and it is now a very difficult point to find a good stock of long-horns; there not being more than half a dozen breeders of them in a district of 20 miles. There is, however, Mr. Allen Kirk's stock of long-horns at Middleton, which for purity of breed cannot be excelled.

' The cattle in this neighbourhood are mostly cross-bred—long and short-horn, short-horn and Scot; but the short-horn, with its various crosses, is that which has encroached most upon the long-horn, and seems to be rapidly superseding that breed.

' That the long-horn breed has deteriorated of late years is not to be wondered at, when a half-bred cow, or any other cross, will fetch a greater price in any of our markets than the pure long-horn, whether it be for the grazier or the dairy.'

Mr. Harrison gives the following account of the long-horn, of the present day. 'The head long and thick, with, a broad forehead, and the top of the head broad and flat; large eye; rather small ear; horns flat at the base, becoming rounder towards their apex, rather drooping from their origin, and then ascending and curling in various directions, The neck and fore-quarters thick and heavy, but fine in the chine; wide in the chest, but the sternum (the breast-bone) does not extend so far anteriorly nor so high as in the short-horn, thereby making the neck appear to issue low out of the chest. Ribs short, body very circular and long in the sides. The horns are rather long, but the transverse processes of the lumbar vertebræ are much shorter than in the short-horn; the quarters are also narrow, owing to the ilium not presenting so broad and horizontal a surface as in the short-horn—many of them are also roughish about the rump, from the bones in the centre of the hip (the sacral bones.) The thigh is generally rounder and larger, consequently affording a better round of beef than the short-horn: the tail is thicker, and the bones of the leg are thicker and heavier. The long-horn weighs heavier in proportion to his size and measure than the short-horn, and his hide is heavier, but it does not handle so loose and free. The colour varies; but a red roan with mottled or red legs, and a white streak down the back, is the prevailing colour. Their average weight when fattened is eight score per quarter, but their value is not so great either for grazing or milking by nearly or quite 2*l.* per head.'

We have extracted this accurate account of the best of the present long-horns, that the reader may be enabled to compare them with the old Bakewellian breed already described, p. 195. Crosses of all descriptions abound in the centre of Lancashire; one between the long-horn and the Holderness or the Durham being the most frequent and the most valuable; and said here, more particularly, not only to retain but to possess in an increased degree the good qualities of both. They suit all parts of the county. They are of a more hardy nature than the short-horn, and they gain by the cross an advantage of more milk and butter; they are also better graziers than the long-horns, fattening in less time and arriving at maturity much earlier. They are finer in the head and neck, the ribs are longer, and they still preserve their cylindrical form. They are wider also across the loins and quarters. They handle more freely, attain a greater weight when fattened, and the hide is not so heavy. The prevailing colour of this cross is red and white.

This first cross is excellent, but the produce is uncertain; and in the majority of cases, the third or fourth generation are long-horns again, but without the good qualities of the original stock. They are of diminished size, they are bad milkers, and will not graze kindly; in addition to which, there is much uncertainty whether the cows will hold to the bull. Full one-third of the cows among some of these half-breds fail of being in calf.

Some breeders, fully sensible of these disadvantages, have wished once more to restore the pure long-horn breed, but there is more difficulty in procuring good long-horn bulls than could be conceived to be possible in Lancashire, the original district of the long-horns: they have, therefore, been compelled to have frequent recourse to the short-horn bull, or their cattle would become almost worthless; yet the cottager, without any resource of this kind, often has a half-horn cow that is invaluable for his purpose. Mr. Harrison, although, with natural partiality, he is unwilling to abandon his native long-horns, relates two experiments which terminated unfavourably with regard to them. The late Mr. Gibson, of Quernmoor Park, near Lancaster, tried an equal number of long and short horns for twelve months; and on summing up the profit and loss at the expiration of the time, the short-horns had given considerably more milk: the butter account was also in their favour; and they had improved considerably more in condition.

Mr. Lamb, of Hay Carr, having to stock Ashton Park, a seat belonging to the Duke of Hamilton, wished to have done so with the long-horns; but not being able to procure a sufficient number at the fair to which he went, he was compelled to buy a great number of half-bred ones. The half-breds fattened and were sold off a considerable time before the long-horns were fit for the market.

Mr. Bolden of Kyning, and Mr. Jackson of Bowick Hall, are breeders of short-horn cattle; Mr. Allen Kirk of Middleton, and Mr. Cottam of Heaton, are almost the only patrons of the long-horns in this district.

Some good cheese is made in this district. The dairy-farmers usually prefer the long-horns; or, if they permit any admixture of short-horn blood, they are anxious that that of the old Lancashires shall decidedly prevail. These cattle, when their milk fails, and they are in tolerably fat condition, average from thirty-six to forty stones, imperial weight. Their summer food is the native grass; their winter food, meadow hay, with cut potatoes (those which are too small for household purposes) with oatmeal or bran, or cut straw; but they are suffered to stand out in the field a great part of the day, although there may be little or no grass for them to eat. The calves are reared only in the spring, and suckled by the hand until they are seven or eight weeks old, when they are turned to grass, but still have a little hay for some time, and also hay-tea, or some other preparation in the evening.

Ralph Thicknesse, Esq. of Beech-hall, near Wigan, will please to accept our thanks for his polite attention to us respecting the cattle of this district.

We have described the north of Lancashire as being peculiarly the native district of the long-horns, and there, although a few short and half horns are occasionally seen, these are the prevailing, or only distinct breed: yet even there they are not what they once were, and comparatively few traces of the Bakewellian improvement remain; nor do the cattle generally appear to be more valuable than when he sent to the borders of Westmoreland for the fathers of the improved Leicester breed.

Within the last few years, however, excited probably by the improvement going forward in Westmoreland, in the north, and in all the south of Lancashire, and jealous of the superiority of the short-horns, some farmers have endeavoured, and with considerable success, to renovate the long-horned breed. It is an object worthy of their attention, for although, as it regards the quantity of milk, the long-horns must ultimately be superseded by one description of short-horn cattle, and in early maturity by another, yet it is too valuable a breed to be lost, or to be much deteriorated.

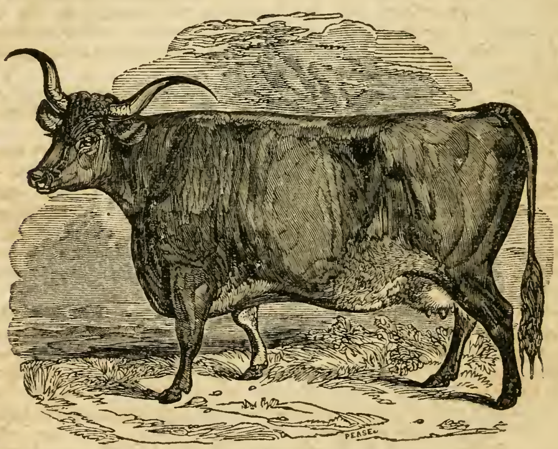
There are many large dairy-farms in this part of the country; the long-horned cow is usually kept. The average produce is from 2½ to 3 cwt. of cheese from each cow, in a strict cheese-dairy farm, the family being also provided with milk and a little butter.

In the Survey of Lancashire, we find the following account of a dairy as usually conducted in this district.

	£	s.	d.		£.	s.	d.
Cow-grass for 20 weeks	3	13	6	Cheese, 11 lbs. weekly for 20 weeks, at 6d. per lb.	5	10	0
Winter keep in hay .	4	0	0	Butter, 6lbs. weekly for 20 weeks at 1s, per lb.	6	0	0
Green food	0	10	0	Calf	1	3	6
Attendance set against manure							
Profit . . .	4	10	0				
	12	13	6		12	13	6

DERBYSHIRE.

The Derbyshire cows were originally long-horns; and although of a somewhat inferior breed, they were very useful animals, and especially in the dairies of this county, the cheese of which has long been admired. What cross gave them their peculiar character, and especially their singular horns, it is now impossible to determine. The head was frequently thick and heavy, the chops and neck foul, the bone too large, the hide heavy, and the hair long; even the bag was often overgrown and covered with hair—a circumstance very objectionable to the dairyman; they were little disposed to take on flesh and fat, for when some of the improved bred heifers had fattened for the butcher, the beasts of the old sort would be little better than skin and bone; yet they were excellent dairy cows.

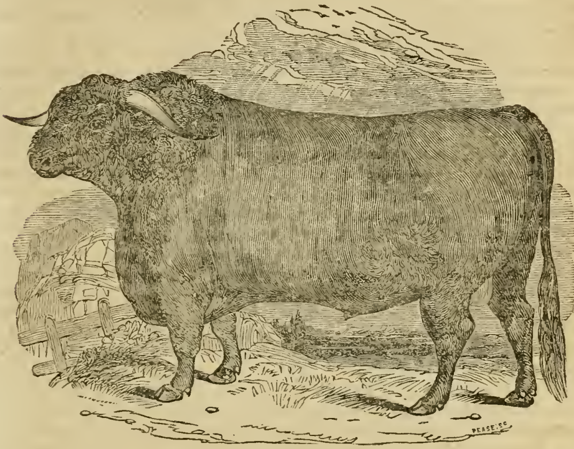


[*Derby Cow.*]

The above cut is a faithful portrait of one of the best of them. The horns are altogether characteristic.

An attempt was first made to cross the Derby with the improved short-horn. The first cross answered admirably; but, as we have said, when speaking of Lancashire, the progeny of this cross was clumsily shaped, and in every respect inferior to its progenitors.

Some partial attempts were also made to introduce a cross from the short-horns and the Devons, but it failed; for although a considerable aptitude to fatten was thus obtained, yet, as a decrease of milk was the consequence, the breed was removed from the dairy; although, for grazing, it probably would have answered well.



[*Derby Bull.*]

This cut gives a faithful representation of the old Derby bull. This breed, however, has gradually died away, and it is comparatively seldom that a pure Derby can now be met with. The short-horns have taken possession of this portion of the territory of the long-horns also. The prejudice against them as to their want of hardiness, and the thinness of their milk, has vanished; and there are few dairy farmers now, and especially in the neighbourhood of Derby, that have any long-horns in their dairy; and yet it is confidently asserted that some cows of the ancient stock have yielded as much as seventeen pounds of butter in the space of seven days.

CHESHIRE.

The short-horn breed has penetrated into this dairy-county, and with variable advantage. Amidst the dense population of some of the agricultural districts the short-horn has materially increased the quantity of milk, but it is more than doubtful whether he has not injured rather than benefitted the cheese dairy.

The Cheshire was chiefly a long-horned breed, of very mingled origin, but which by degrees accommodated itself to the climate and the soil. It contained in it a portion of the blood of the old Lancashire, the Derbyshire, the Shropshire, the Staffordshire, and the new Leicester; and this in some slight degree dashed with the Irish long-horn, the Welsh and Scotch middle-horn, and the Yorkshire short-horn, and from a strange intermingling of the whole proceeded the Cheshire cow. She was a rather small, gaunt, and ill-shaped animal; yet she possessed a large thin-skinned bag, swelling milk-veins, shallow and light fore-quarter, wide loins, a thin thigh, a white horn, a long thin head, a brisk and lively eye, and a fineness and cleanness about the chops and throat. She has been crossed still more with the Durham. She has become of larger size, handsome in form, apter to fatten; but she has been decidedly injured as a cheese-dairy cow; her quantity of milk has not been materially increased, and the quantity of caseous matter produced from it has been diminished, and somewhat deteriorated.

Mr. Holland, following closely a former report by Mr. Wedge, and before the short-horns were so extensively introduced, says that ‘ calves to keep up the dairies are generally reared from the best milkers, both as it regards bull-calves and heifers. Those which are reared are generally calved in February or March, and are kept on the cows for about three weeks. They are afterwards kept on warm green whey, scalded whey and butter-milk mixed, or hard fleetings. Some give oatmeal gruel and butter milk, with a little skimmed-milk mixed. This is given twice in the day, until the calves are turned to grass, and once in the day for three or four weeks after that. During the first and second winters they are kept in a yard with an open shed, well foddered, and turned out as soon as the grass is ready. In the summer following, when they are two-years-off, they are put to the bull; and during the third winter, they are, by the best farmers, tied up at the same time that the cows are: they are fed with straw night and morning, until a month before calving; hay is afterwards given as long as they continue housed, and sometimes crushed oats when they calve early.

The cows are taken up into the cow-houses as soon as the weather gets bad, and are permitted to go dry about ten weeks before calving. The usual dry food is wheat, barley, and oat-straw, hay, and crushed oats. The two former kinds of straw are given to those which are expected to calve early, on account of a supposed tendency to dry the milk up sooner; oat-straw, and sometimes hay, is given to those that are not expected to calve until late in the spring, hay is given to all of them three or four weeks before they are expected to calve. From the time they have calved until they are turned out to grass, crushed oats are given twice in the day, and at the rate of three-fourths of a bushel per week. The cows are turned into an *outlet* (a bare pasture-field) near the building, from nine or ten in the morning, until three or four in the afternoon, but have no fodder in the outlet; or if they show a desire of being taken up again, they are let into the yard and housed, and this is better than suffering them to stand shivering with cold in a field without shelter. The turning the cows out to grass in good condition is a matter much attended to, in order that they may start well; for if a cow is not in good condition when turned out to grass, or has been too much dried with barley-straw, it is a long time before she gets into full milk.

The introduction of green crops and particularly of turnips, and the practice of stall-feeding for dairy cows, has materially altered the old system of management. The grand object with the dairy farmer is to increase the quantity of his milk, and to continue it as long as possible. This cannot be more effectually done than by giving green or succulent food. The milk is more abundant, and it may be continued a month longer. The ox-cabbage and the Swedish turnips are the kinds of green food most cultivated in Cheshire. The former is given when the after-grass is consumed; the latter are used in the winter, when the cattle are feeding on straw; and as little cheese is then made, the flavour which they communicate to the milk is not of so much consequence.

The peculiar art of the manufacture of the Cheshire cheese belongs to our work on 'British Husbandry,' generally. We have, at present, only to do with the cattle themselves. To that portion of 'The Farmer's Series' we beg to refer our readers, and also to Holland's 'General View of the Agriculture of Cheshire,' and Aiton's 'Treatise on Dairy Husbandry.'*

There is, however, nothing singular in the management; and Mr. Holland states it to be the prevalent opinion, that the quality of the soil is the principal thing concerned. The breed of the cattle has much to do with it, and the new breed has not yet identified itself with the soil.

Mr. Fenna calculates the number of dairy cows kept in Cheshire at about 92,000; and averaging the quantity of cheese made annually from each cow at 2½ cwt., it will appear that the amazing quantity of 11,500 tons of cheese are made every year in that county.†

NOTTINGHAMSHIRE.

This county, fifty years ago, contained few cattle except long-horns. It has already been stated, in page 189, that the females, from whom ultimately sprung the improved Leicester breed, were from Nottinghamshire. The earliest breed of which we have mention came from Drakelow, on the borders of the Trent. The cows which Mr. Webster brought to Canley were from the same farm; and Mr. Bakewell's two heifers, the mothers of all his stock, were purchased from Mr. Webster.

The better kinds of cattle, however, were confined to the banks of the Trent. In the clay district, the beasts were poor and coarse; and in the forest, few that were valuable were bred. The short-horns have here also completely superseded the old cattle. They first began to appear in the vale of Belvoir, and thence spread through the lime and coal districts; and now, either in the form of the pure Yorkshire cow, or many a varying and mingled breed, they occupy nearly the whole of the county.

LEICESTER.

In this county, in which the long-horns had been brought to their highest perfection, it would be imagined that the latest and most obstinate battle for supremacy would be fought between the long and the short-horns. What was the peculiar breed of Leicester before the time of Bakewell, it is now impossible to ascertain. Probably there was not any distinct one; at least we have no record of it, and it was altogether neglected by Bakewell, throughout the whole of his experiments.

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* Fuller, in his 'Worthies,' p. 68, thus speaks of the Cheshire cheese. 'This county doth afford the best cheese for quantity and quality, and yet their cows are not, as in other shires, housed in the winter; so that it may seem strange that the hardiest kine do make the tenderest cheese. Some essayed in vain to make the like in other places, though from thence they fetched both their kine and dairy-maids; it seems they should have fetched their ground too, wherein is surely some occult excellency in this kind, or else so good cheese will not be made. I hear not the like commendation of the butter in this county, and perchance these two commodities are like stars of a different horizon, so that the elevation of the one to eminency is the depression of the other.'

Dr. Leigh, in his 'Natural History of Cheshire,' and Dr. Campbell, in his 'Political Survey,' attribute the peculiar flavour of the Cheshire cheese to the abundance of saline particles in the soil of this county, and the latter says that where the brine springs most abound, the cheese is esteemed to be of the most superior quality; but this notion is now exploded.

The places and districts most celebrated for making the prime chesse—are the neighbourhood of Nantwich, the parish of Over, the greater part of the banks of the river Weaver, and several farms near Congleton and Middlewich.

† In Lyme Park is a herd of upwards of twenty wild cattle, of the same sort as those at Chillingham, chiefly white with red ears. They have been in the Park beyond the memory of any one now living; and as there is no account of when they were placed there, the tradition is that they are indigenous. In hot weather, these cattle generally herd on the hills and high grounds; and in winter in the woody parts of the park. In severe weather they are fed with hay, for which, before the hollies with which the park abounded were cut down, holly-branches were substituted. Two of the cows are generally shot yearly for beef.—Lyson's Magna Britanica, Chester, p. 729.

The Leicestershire grazing grounds were always occupied by a strange variety of beasts from Ireland, Scotland, and Wales, and from Staffordshire and Shropshire, and Herefordshire and Lancashire, and every neighbouring county. It was one of the recognised feeding districts for the metropolitan market, and its own breed was made up of a mixture of all the sojourners.

Bakewell, however, created a breed for this county, the name and recollection of which will never be lost, notwithstanding the breed itself has so completely passed away. Although, however, the improved Leicester long-horns have disappeared, it was from no fault of theirs—Bakewell's was decidedly an improved breed, the coarser parts of the animal were lessened, and the more valuable were increased; but they gradually yielded to the superior claims of a race of cattle at that time scarcely known.

Where a few of the long-horns do linger, the *improved* Leicesters are gone; they are the old breed of the country retained or returned. For grazing, and for early maturity, the long-horns must yield to the Durhams; and it is only their adaptation for particular localities, and the peculiar quality of their smaller quantity of milk, in the production of certain varieties of dairy produce, that enable them anywhere to maintain the contest. Thus they remain in Cheshire, in despite of the somewhat injudicious attempts to displace them, and the stock of few of the dairy farms of this and the neighbouring counties. About Hinchley, Bosworth, Appleby, and Snarestown, a few of the farms are supplied by the long-horns, and more by a mixed breed between the Lancashire and the Durham. More than 1500 tons of cheese are made in Leicester every year, and it is said that 5000 tons are annually sent down the Trent from this and the neighbouring counties.*

RUTLANDSHIRE.

This little county could never make pretensions to a peculiar breed. Grazing was always the principal object here, and the Irish and small Scotch were most in request. Marshall, in his 'Agriculture of the Midland Counties,' says that in his time, the Irish had not long been known in Rutlandshire; but that they were then bought in preference to the Welsh, and Shropshire, and large Scotch, which had been previously grazed. After one summer's grass, they were usually sent to London, stall-feeding being little practised; and occasionally hay was given in the fields to some of the best of them, to keep them until after Christmas. Many of the short-horn cattle, however, are now grazed in Rutland. The heifers are bought in at two years old, and sold in calf at three years old to the jobbers, who take them to the dairy counties, or to London.

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* The celebrated *Stilton* cheese was first made at Wimondham, in the Melton quarter of Leicestershire. Mr. Marshall gives the following account of it:—'Mr. Paulet, who resided at Wimondham, a relation of Cooper Thornhill, who formerly kept the Bell at Stilton, in Huntingdonshire, on the great north road from London to Edinburgh, furnished his house with cream-cheese, which, being of a singularly fine quality, was coveted by his customers; and through the assistance of Mr. P., his customers were gratified at the expense of half a crown a pound. In what country this cheese was manufactured was not publicly known, and hence it obtained the name of Stilton cheese. At length the place of producing it was discovered, and the art of producing it learned by other dairy-women of the neighbourhood. Dalby first took the lead, but it soon made its way in almost every village in that quarter of Leicestershire, as well as in the neighbouring villages of Rutlandshire. Many tons of it are made every year.'

HUNTINGDONSHIRE.

In the statistical account of it, it is stated that the county contained '9245 head of cattle, almost all of a mixed breed, and of a very inferior one too' Parkinson in his 'Survey' of this county adds, that they were 'of all kinds, but good ones:' yet he confesses that they were beginning to improve on the side of Bedfordshire and Northamptonshire. Stone says, that they are for the most part purchased at distant fairs, and are the refuse of the Lancashire, Leicestershire, and Derbyshire breeds, or are bred from these sorts without any particular care in selecting them. They have very materially improved. The mongrel long-horned breed of the county has disappeared, and a great many pure short-horns are now found, or a cross between them and the Derbyshire. The cross between the two is gradually disappearing, and the short-horns are taking undisputed possession of the district.

CAMBRIDGESHIRE.

The native breed of this county was a long-horn one; but now the short-horns prevail in every dairy where the land is tolerably good, and on poorer land there is a smaller half-horn breed, which yields more and better milk than its appearance would indicate, but is slow and unprofitable to fatten. The Rev. Mr. Gooch, in his 'Survey of Cambridgeshire,' tells us that Cambridgeshire having been a dairy country from time immemorial, among other good milking stock attempted to be introduced, were the polled cattle, from the neighbouring county of Suffolk. Mr. Fuller purchased a dairy of them, but they began speedily to decline, when he re-sold them to their former owner, who took them back to their native situation, in which they were speedily restored to their original health.

It is true that the Suffolks have never extensively established themselves in Cambridgeshire; but we know some dairies of them which answer exceedingly well.

Few parts of England produce better butter than Cambridgeshire. It is curiously rolled up in pieces of more than a foot in length, and not two inches in diameter, for the convenience of the collegians, to whose table it is sent in slices, called pats. A great deal of butter is likewise sent to the London market, but there is not much cheese made, except at Sohan and Cottenham. A great many bullocks are grazed, consisting chiefly of the country stock, the Norfolks and Suffolks, and the Galloway Scots. The most profitable method of grazing is to buy them about autumn, and sell them at the succeeding autumn; keeping them on hay and grass in the winter, and finishing them off on grass. On the grazing grounds about the fens, many Devon cattle are now prepared for the markets.

NORTHAMPTONSHIRE.

Northamptonshire is not a breeding district, but cattle are brought from other districts and purchased for the London market, and they as usual consist of a great variety of breeds. An Agricultural Society has, however, been established in this county, and is conducted with much spirit; and in consequence of this, the short-horns are now diligently cultivated by many intelligent farmers.*

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* Marshall, in his 'Agriculture of the Midland Counties,' and quoting from 'Donaldson's Survey of Northamptonshire,' says, 'Very few cattle are reared in this county;

The soil of Northamptonshire varies from a cold clay to a red loam. The cattle are first grazed in the old pastures, and those that have not been made fat at grass are afterwards stall fed. In the red loamy soils which are adapted for turnips, stall-feeding on them, with an addition of seed-hay, is generally adopted.

No cattle are used in husbandry.

It has been remarked to us by an eminent Northamptonshire breeder, that the quarter evil, or black leg (inflammatory fever) is rarely known among young cattle in this county. If this be true, it is an important fact, for there is nothing peculiar in the management of cattle here, and it would seem to connect the disease in some measure with the climate or the soil, and its productions. Observations on the districts where this disease is most prevalent, or rarely found, and the management of soil and produce of those districts, might lead to some useful conclusions as to the cause of so generally prevalent and fatal a disease.

BEDFORDSHIRE.

In Bedfordshire, also, the long-horns, the old cattle of the county, have altogether disappeared. There is not a single farmer who breeds them in their pure state. Some half-horn cattle are to be found among the small farmers, and the cow of the cottager is here, as in so many other districts, the produce of the old long-horn and the Yorkshire, crossed in every possible way, and retaining the milking properties of the one, and the hardihood of the other, and therefore fitted to become the poor man's cow.

With this exception, there is no distinguishing breed belonging to the county. A few gentlemen have the Devons—more prefer the Herefords, and still more the short-horns; the short-horns, indeed, are here, as everywhere else, superseding the rest.

Bedfordshire contributes much to the supply of the dairy cattle of the metropolis. Many heifers are brought from the north, and having been delayed for a while in this county, and become heavy in calf, are sent forward to the metropolis. By some farmers, and in this respect we imagine foolishly over-reaching themselves, they are detained longer; they are milked for one or two years, and then despatched to the metropolis.

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a few only in the open field (lordships excepted,) and these are so crossed and mixed with the breeds of other counties, which are often improperly chosen, and so stinted in their food, as to render them comparatively of little value.

'In a few instances where attention is paid to the breed of cattle on the inclosed farms, the *long-horns* are the kind most preferred, and are far superior to the original breed of the county, both in size and shape, and extraordinary disposition to fatten.

'The dairy farmers in the south-west part of the county, however, prefer the *short-horn* Yorkshire cows, from which county they are principally supplied; and as they never rear any calves, they sell them when a few days old to a set of men who make a trade of carrying them to the markets of Buckingham and other places, where they are purchased by dairy farmers from Essex, to be fatted for veal for the London markets.

'Soon after Lady-day, the farmer begins to purchase bullocks, and the breeds of Shropshire and Herefordshire are preferred. In the course of the summer, some Scotch and Welsh cattle are bought in—he begins selling off in September, and by the beginning of February the whole are disposed of.

'The manner of transporting the calves used to be both absurd and cruel. The jobber had often a long round to take to complete his purchases; and after that, he had to travel 70 or 80 miles before he reached his abode or place of sale in Essex. Sometimes twelve or sixteen calves were put into one cart, and laid on their backs in the straw, with their feet tied together; and if the journey occupied seven or eight days, they had rarely any thing to eat but wheat-flour and gin mixed together, well known in that line of country by the name of gin-ball, and thus the calves were kept in a state of stupidity or intoxication during the whole of the time.'

Very few short-horns are bred in Bedfordshire, and indeed, very few of any other breed, except by two or three spirited agriculturists, at the head of whom stands the Duke of Bedford.

Francis, Duke of Bedford, began to devote himself to agricultural pursuits in the year 1795 or 1796. The chief object of his attention was the improvement of the breed of sheep; and of the spirit with which he entered into this, and the extent to which the country is indebted to him, and of those interesting and princely meetings, the annual sheep-shearings and the exhibition of stock, we shall speak in our volume on Sheep. In other parts of the 'Farmer's Series,' and particularly in the treatise on 'British Husbandry,' justice will be attempted to be done to the labours of this patriotic nobleman in every department of agricultural science. There were few breeds of cattle whose relative qualities and value were not put fairly to the test at Woburn, and one breed after another was abandoned, until at his decease in 1802, he was balancing between the North Devons and the Herefords.

His brother, the present Duke of Bedford, (1833,) to whom we are indebted for permission to view every part of his farm, and for much valuable information besides, gave the preference to the Herefords; and they, with the exception of a few Ayrshire and Yorkshire cows, to provide milk for the calves and for the houses and always a succession of West Highlanders to graze, constitute the whole of his stock.* Although he abandoned the North Devons, he still considered them to be an admirable breed of cattle, and only inferior to the Herefords, as not suiting the soil of Woburn quite so well. A few North Devons are still kept for farm work, but they are not the true Bideford breed, but of the somewhat heavier, but still more useful variety, most prevalent on the borders of Somersetshire.

The pasture at Woburn is somewhat inferior to that of Herefordshire generally, and the cattle selected, and having much in them in the blood or Messrs. Tulley's and Tomkin's and Price's stock, are not so large as those which are principally met with on their native soil; and they are not the worse for this. They lose much of the heaviness and coarseness of the shoulder which has sometimes been objected to in the Herefords, and they retain all the length of quarter, and much of the wideness and roundness of hip, and fullness of thigh, which have been esteemed the peculiar excellences of the Herefords. A few of them might in their fore-quarters be mistaken for Devonshires; but with a broadness of chine and weight behind which the Devons have rarely attained. There is little that is unusual in the feeding of these beasts. The calf lies with the mother for about a week, and is then taken away, and fed at first with milk from the dairy, and, afterwards, with skim-milk. It then runs on the ordinary pastures until two years old, when it is put on better keep; it passes the third summer at grass, is stall-fed in the winter, and ready for market at three years of age, and will attain the average weight of ninety or ninety-five stones. His Grace has often exhibited cattle at Smithfield of a far superior weight.

His present stock consists of from thirty to forty cows. The bull-calves are fattened; the best of the females are retained for breeding; and other beasts being bought in in the summer and autumn, seventy or eighty are usually stall-fed every winter. A new range of cattle-sheds and piggeries has been lately erected; a water-mill in the yard is fed by a concealed stream; the straw-yards are excellently contrived; and every possible convenience, of a simple and unostentatious form, but in the structure of which neither expense nor ground has been spared, is to be found on the premises. Although the Herefords are now established at Woburn, the spirited proprietor of the abbey has not discontinued the experiments which were instituted by his brother, in order to determine the comparative value of other breeds. Mr. Todd, the very intelligent bailiff of his Grace, permitted us to have access to many of the records of these experiments. Our readers will not object to the transcription of one or two of them.

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* No polled cattle are now grazed on the Woburn estate. After many trials, and some of them on a large scale, the Duke of Bedford gives a decided preference to the horned breeds. When the polled cattle were grazed there, the Galloways had gradually given way to the Angus, and Mr. Todd expressed to us his decided opinion, that they fed faster than the Galloways, and afforded meat equally as good.

'1819, May 20th, four Pembroke spayed heifers in good store condition, bought April the 29th, at 16*l.* 5*s.* each, and four polled Galloway spayed heifers, bought December 22nd, 1818, at 11*l.* 11*s.* each, in store order, but rather fresher than the above, having been wintered on the farm with very refuse bad hay, were put to grass in the same field, and kept there until October 21st, being a period of five months.

	Ton.	Cwt.	qrs.
The Pembrokes weighed on May 20 . . .	1	12	0
On October 21st they weighed . . .	1	19	2
Gained in weight in the five months. . . .	0	7	2
The Scots weighed in May . . .	1	10	1
Ditto in October	1	18	2
Having gained	0	8	1
And being an excess of weight gained above that of the Pembrokes of	0	0	3

	£.	£. s.		£ s.
The Pembrokes sold at	84	Cost. 65 0	Gained by grazing	19 0
The Scots . .	74	Cost 46 4	Gained . .	27 16
Excess of gain in favour of the Scots				8 16

From which, however, is to be deducted the value of the refuse hay which they ate.

'Twenty Devons and twenty Scots were bought in in October, 1822, and wintered.

'Ten of each sort were fed in a warm straw-yard upon straw alone, but with liberty to run out upon the moor.

'Ten were fed in a meadow, having hay twice every day until Christmas.

'They afterwards lay in the farm-yard, and had oat-straw and hay, cut together into chaff. They were then grazed in different fields, equal proportions of each sort being put into the same field.

'Those that lay in the warm straw-yard with straw only, were ready as soon as the others, although the others had an allowance of hay during the winter.

'Sixteen of each were sold at different times; March 24th, 1824 being the last sale. The Scots were ready first, and disposed of before the Devons.

	£	s.	d.
The Scots cost 7*l.* 12*s.* 10*d.* each, amounting to 122*l.* 5s. 4*d.*; they sold for 235*l.* 18*s.* 6*d.* Gain by grazing	113	13	2
The Devons cost 7*l.* 6*s.* 6*d.* each, amounting to 117*l.* 4*s.*, and they sold for 250*l.*; but not being ready, on the average, until between six and seven weeks after the Scots, and estimating their keep at 3*s.* 6*d.* per week each, amounting to 18*l.* 14s. 6*d.*, and this being substracted from 230*l.*, there will remain as the sum actually obtained for them 211*l.* 5*s.* 6*d.* Gain	94	1	6
Making a balance in favour of the Scots	£19	11	8

The remaining four of each breed were kept and stall-fed on turnips and hay. The Scots sold at 75*l.*, and the Devons at 84*l.*, the account of which will be as follows:—

	£.	s.	d.
Four Devons at 7*l.* 6*s.* 6*d.*, cost 29*l.* 6*s.*; they sold for 84*l*; leaving gain by stall-feeding - - - - - - - - - - - -	54	14	0
Four Scots at 7*l.* 12*s.* 10*d.*, cost 30*l.* 11*s.* 4*d.*; they sold for 75*l.*; leaving gain by stall-feeding - - - - - - - - - - -	44	8	8
Making balance in favour of Devons - - - - - - -	10	5	4
Or total balance in favour of Scots - - - - - - - -	9	6	4

This experiment seemed to establish the superiority of the Scots for grazing, and the Devons for stall-feeding. But as the gain by the four stall-fed Devons was half as much as that by the sixteen Scots at straw-yard, it was determined that another experiment should be made, in which the whole should be fed alike, both at grass and in the stall.

Twenty Scots and twenty Devons were again bought in in October, and sold at different times, but always an equal number of each at each time, the last sale taking place in March.

	£.	s.	d.
The twenty Devons cost 189*l.* 9*s.*; they sold for 370*l.* 17*s.* 10*d.*; leaving for feeding - - - - - - - -	181	8	10
The twenty Scots cost 212*l.* 3*s.*: they sold for 374*l.* 5*s.* 1½*d.*; leaving for feeding - - - - - - - -	162	1	1½
Balance in favour of the Devons - - - - -	£19	9	8½

Two experiments, on the fattening properties of different kinds of food, will not be unacceptable to our readers.

Six Scots, previously grazed together, in the same field, were taken up and stall-fed on the 6th of January, 1823, and the feeding was continued until the 14th of April. They were divided into pairs.

To each of one and two were given daily, one bushel of mangel-wurzel, two quarts of bean and barley flour mixed, and as much hay as they would eat.

Three and four had one bushel of Swedes each, with the bean and barley flour, and hay.

Five and six had three pecks and a half of potatoes, with the bean and barley flour, and potatoes.

	£.	s.	d.		£.	s.	d.
One and two consumed 18 cwt. 1 qr. of hay at 3*l.* amounting to 2*l.* 14*s.* 9*d.*; 1½qr of flour at 3*s.* 1*l.* 16*s.*; and 196 bushels of mangel-wurzel at 9*d.* 7*l.* 7*s.* amounting to - - -	11	17	9				
They gained 3 cwt. 1 qr. 7 lb. at 5*s.* 4*d.* per stone at that time - - -	12	7	4	Gained by feeding	0	9	7
Three and four consumed 20 cwt. 2 qrs. of hay at 3*l.*, 3*l.* 6*s.*; bean flour 1*l.* 16*s.*. and 196 bushels of Swedes at 9*d.*, 7*l.* 7*s.* amounting to	12	9	0				
They gained 3 cwt. 2 qrs. 21 lb. at 5*s.* 4*d.*	13	15	4	Gained by feeding	1	6	6
Five and six consumed 23 cwt. of hay at 3*l.*, 3*l.* 9*s.*; bean flour 1*l.* 16*s.*; 78 bushels of potatoes at 1*s.* 1*d.*, 4*l.* 4*s.* 6*d.* - - - -	9	9	0				
They gained 2 cwt. 3 qrs. 7lb. at 5*s.* 4*d.*	10	0	0	Gained by feeding	0	11	0

We will condense our account of the second experiment. Two Scots were fed on English linseed cakes; two Devons on unboiled linseed; two others on boiled linseed, and another pair of Devons on foreign, all of them having as much hay and chaff as they could eat. It was a losing concern in every case; the value of the manure was not equal to the difference of the cost and the selling prices, and strange as it may appear, the greatest loss was sustained when the beasts were fed on oil cake; the next when foreign cake was used, the next when boiled linseed was used, and the least of all when the simple unboiled linseed was given.*

We might make many more extracts, but these will show the spirit with which this noble agricultural concern was conducted, and give us some idea of the value of those who will devote their time and their property to such pursuits.

BUCKINGHAMSHIRE.

This county, once inhabited by the long-horns, has now no distinct breed of its own. The greater part of the cows and grazing stock is bought in. It consists almost uniformly of the short-horns for both purposes; many of the Lincolns are selected for grazing, and the Yorkshire milch cow for the dairy.

Mr. Marshall truly says, that with the exception of Pevensey Level and Romney Marsh, there is no land in the kingdom better adapted for grazing than the vale of Aylesbury. Its amazing fertility soon makes a visible alteration in the appearance of every beast, and causes them to attain to an extraordinary size—these are proofs of the qualities of the land. The cattle are grazed about ten months, and do not often require any additional care than a supply of hay in the field during winter.

Vast quantities of excellent butter are sent from the vale of Aylesbury to the metropolis. The butter merchants contract for it at different prices, varying with the season of the year; and the carrier contracts for the transport of it, at a certain charge for each dozen pounds, finding cloths, baskets, &c. He fetches it from the dairyman and delivers it to the merchant.

BERKSHIRE.

The long-horns had penetrated as far south, as this county, and at the close of the last century fully occupied it. They bore much resemblance to the cattle of Oxfordshire and Warwickshire. The different breeds of the Yorkshire cattle have now, however, completely superseded them. A long-horn beast is now rarely seen, and even the half-horns are disappearing. Mr. Tomkins, of Abingdon, and Mr. Webb, of Oakingham, were particularly distinguished by their early introduction of this breed.

In the forest districts of Berkshire, many Welsh and Scotch cattle are grazed, and heavier cattle occupy the more fertile pastures.

A considerable quantity of butter is made on the borders of Oxfordshire, and a part of the Vale of the White-horn is celebrated for its cheese. It is principally sold in London under the name of single Gloucester cheese, and is formed in the press into a variety of curious shapes. Mr. Mavor conjectures that ‘ they sell more dearly than other cheese, partly on account of their shape, and partly because the best cheese is supposed to be thus honoured.’ These pine-apple cheeses are made without any pressure from a machine: they are suspended in nets which gives them the curious indentations which they present. From the wharf of Barcot, in Oxfordshire, nearly three thousand tons of cheese are sent down the Thames for metropolitan consumption, partly collected from neighbouring parishes in other counties, but principally from Berkshire.

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* To many records of experiments on the comparative fattening qualities of the Hereford and Durham cattle we will not now refer. One, although not then assigned to its proper author, the present Duke of Bedford, was detailed at page 34 of this work. We will content ourselves with referring to that. The patrons of the short-horns, however, have not considered it as altogether satisfactory in its details.

HAMPSHIRE.

Hither also the long-horns penetrated, and were the prevailing breed, but they may be said to have perfectly disappeared. They have given way to the Devons, and indeed to breeds of every sort, and, more particularly near the coast to the Alderney, or smaller breed of Norman cows.

The latter are the favourites in consequence of the greater quantity of milk which they yield in proportion to the food which they consume. Good meadow land, however, is not plentiful in this district, and is very dear; the dairy, therefore, is comparatively neglected on too many farms, and little more butter is manufactured than is necessary for the consumption of the county. The short-horns are beginning to find their way into Hampshire, and where the soil is productive they are profitable, but much of the county is incapable of supporting so large an animal. Our friend, Mr. Moulden, informs us, that in the neighbourhood of Winchester, the Norman is often crossed with the Hereford; the Norman is not injured as a milker, while she is improved in size and disposition to fatten. About Southampton, the Alderney is the prevalent breed. There are many facilities for obtaining her from the contiguous islands of Guernsey and Jersey. In this part of the county, the Alderney has been crossed with the forest breed, and also with the Suffolk. The forester has improved, and the Norman has deteriorated in consequence of the first cross, and the second has been attended with doubtful success. Next to the Alderneys, the Suffolks are most in favour on the coast of Hampshire.

Mr. Gawler, in his 'report of a North Hampshire Farm,' (Farmer's Series, No. vii. p. 15,) states that the 'stock in general best adapted to this soil are the Alderney, and the smaller race of Norman cows. The Devonshire and larger breeds require richer pasture; and although they may be kept in condition, the milk they give is by no means in proportion to the bulk of food they consume. Mr. Gawler's dairy stock was in the proportion of one cow of the Devonshire breed to three of the Alderney or Norman, and the milk was mixed on the presumption that, being thus diluted, it produced better butter, and a larger quantity of it.'

Sir Richard Simeon has favoured us with a description of the cattle in the Isle of Wight. They are a small mixed kind without any of those peculiarities which would mark them as distinct breeds. Scarcely any oxen are bred from them; cow-calves are saved for the purpose of keeping up the dairy; invariably from the best milkers, and not with any view to their aptitude to fatten.

The dairy stock has been occasionally mixed with the Guernsey or Alderney cattle, and with success so far as the quantity and quality of milk go. Some attempts have been made to introduce the short-horns, and in some instances the cattle of the island have been improved in size and appearance; but, looking to the general capabilities of the island for the maintenance of large stock, and fitting them for the purpose of the butcher, it may be doubtful whether the smaller and rougher kind of cattle may not be a safer description of stock, and likely to produce a better result to the farmer. The Alderney is a favourite breed—a cross between the Devon has produced some very good cows here, well adapted for the dairy, and not unprofitable for the butcher.

The value of the Isle of Wight cattle depends almost exclusively upon their being good milkers: for the purposes of the butcher, many of them are of little value, on account of the generally received opinion, that a cow which has an aptitude to fatten is a bad milker. The farmers rarely breed from a cow which has good points for grazing.

The smallest farmer in the Isle of Wight has a dairy, and the contrast is very striking to an inhabitant of the island who visits the neighbourhood of Winchester, in the same county, where he may ride many a mile without seeing a cow, because it is the custom to keep bullocks on that land only that will not do for sheep.

Mr. R. G. Kirkpatrick has informed us, that the only farms that are calculated for grazing lie along the streams that run through the valley on the South side of the Chalk Downs, and chiefly on the Brading stream. Lord Yarborough, at Appeldurcombe, is one of the most extensive graziers in the island. He annually imports forty or fifty head of cattle from his estates in Lincolnshire and from Scotland. The other graziers attend the different markets in the south and west of England, and buy chiefly Sussex, Welsh, Devonshire, and other west country cattle. The whole importation amounts to about 500 annually, besides which there are about 100 west country calves brought into the island a little before midsummer. These are partly taken into the dairies and partly kept for fattening. One of the finest dairies in the island belongs to Sir Richard Simeon. His cows are of a larger sort than are generally seen here, and crossed with the Durham. He has devoted a great deal of time and expense to agricultural pursuits. He first introduced mangel-wurzel and Swedish turnips into the Isle of Wight.

Oxen are not much used in husbandry labour; and the few ox-teams which we see on the south side of the Downs are generally brought from the west of England. They are used in field labour, but not on the road, from the notion that their feet would suffer, and that they are not so well adapted as horses for this kind of work. They are found to work in the field nearly as fast and as well as horses, and are kept at much less expense.

WILTSHIRE.

The whole of Wiltshire, but particularly the northern division of it surrounded by the counties of Gloucestershire and Berkshire, was, at the close of the eighteenth century, chiefly occupied by the long-horns.*

They are described by Mr. Baden, of Day-house, (to whom we are indebted for much information respecting this district,) as 'a fine, healthy sort, good for the dairy and for feeding, and with immense spreading horns. Those, however, which were formerly most approved of for the dairy, had smaller horns, bending towards the mouth, but they were not favourites with the grazier or butcher, because their flesh was sometimes tough. They used to average from thirty-six to forty-eight scores.' Mr. Baden has raised them to fifty scores, and a relative of his has carried them on to sixty scores, confining them to grass and hay alone. Many scientific agriculturists used to object to these long-horned cattle. They were said to be too heavy—they injuriously poached a land, the great fault of which was, that it was already too cold and wet—they did not come to perfection until they were at least two years older than the common cattle of the country, (Bakewell's improvements were then unknown;) and, comparing bulk for bulk, they did not yield a proportionate quantity of milk, nor equal to the additional quantity of food which they consume. Some strenuous efforts were made to replace them by the Devons, smaller in size, and being less liable to tread and poach the wet lands—ripe at an earlier age than the long-horned cow, and fattening more speedily, but there seemed to be these objections, that they were deficient in milk; that milk was good, but not better than the milk of the long-horn, and consequently the same quantity of cheese was not produced, and they were not sufficiently hardy for the cold and wet grounds on which they were placed: they therefore never obtained any firm footing in Wilts.

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* 'It does not appear what was the original kind of cow kept in this district, probably the old Gloucestershire cow, a sort now almost lost, or, perhaps, as is the case in Somersetshire, a mixture of all sorts: but the uinversal rage for upwards of twenty years past has been for the long-horns, or, as they are called, the 'North country cows,' and at this time, perhaps, nine-tenths of the dairies in this district are entirely of that kind. The reasons given for the general introduction of that sort are the nearness of their situation to the north country breeders, but perhaps the real reason is that 'pride of stock,' which operating like 'the pride of sheep and horses,' in South Wiltshire, has gradually led the farmers to an emulation in beauty and size more than in usefulness and profit, and which pride the breeders have not been wanting in using every artifice to create and promote.'

The long-horns are now, however, almost extinct. Although they were really valuable, they seemed to retreat before the short-horns, even more rapidly than the other varieties of the old long-horns. A cross of them with the short-horns remains, and are excellent dairy cattle. They yield daily from four to five gallons of milk, during the height of the season. They are an improved breed, for they retain the hardihood of the old long-horns and good quality of the milk, with the early maturity and quantity of milk of the short-horn.

This cross-breed, however, must be carefully watched, for it is exceedingly apt to degenerate. Frequent recurrence must be had to the short-horn bull, and the bull must often be changed. There are, however, in various parts of North Wilts, and particularly in the hands of the cottagers, as various and inexplicable crosses as are to be met with in any part of the kingdom, and some of them exceedingly useful beasts. It should be contrived that the cows shall calve from Christmas to Lady-day on a warm, early soil, but not until three weeks later on a backward, cold land.

Mr. Baden recommends that warm water should be given to the cow after calving, especially if she has not cleansed, for cold water will often retard or prevent the expulsion of the after-birth, and particularly not to draw all the milk from the teats for the first twelve hours.

If the calf is strong and healthy, the best time for weaning is at the expiration of the third week; it should be put into a cow-house, and served from a pail: it will drink readily after being kept one meal from the mother. One quart of skimmed milk, added to one warm from the cow, is deemed a sufficient meal, and good hay should be placed before them, for they will eat earlier than has been imagined; they should be fed as nearly as possible at the same hour morning and evening; and as soon as the grass appears, they should be turned out into a meadow during the day, and the milk by degrees left off. In the month of October, they should be put into a house and bled, and three ounces of Glauber's salts should be given on three alternate mornings, to prevent the murrain: in winter, a warm pen, or dry pasture, should be allowed. If they are to have calves at two years old, they should be weaned in February, and they should not calve before May. If they are to calve at three years old, time and feed are not material.*

The cast-off cows and the steers are fatted sometimes on grass and hay, sometimes on hay and meal, or hay and Swedish turnips; the latter is preferable when the hay is old and good.

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* In many parts of this district, the calves are seldom reared. The farmers say that they can generally buy them cheaper than they can rear them on land that is generally too good for the purpose, and rented too dear; and that calves will pay better to be sold as veal, than to be kept for stock. There is one thing, however, of which the dairyman everywhere does not seem to be sufficiently aware, that few cows will settle so well on a farm, or turn out so profitable, as those that have been reared on it.

We have given this account somewhat at length, as embodying the management of cattle by the best farmers in North Wilts. There is a very great proportion of grass to arable land through the whole of this division of Wiltshire, and very much of the grass land is heavy and wet: hence the necessity for more cattle than are usually found on such extent of ground, and custom, old as the memory of man, has made it a district for the production of cheese. The North Wiltshire cheese is known in every part of the kingdom. It was at first an humble imitation of the Gloucester, but it is now equal to the best from that county, and even from the Vale of Berkeley itself.

Mr. Davis, in his Survey of Wiltshire, gives an opinion, that is to a very considerable extent well founded, and from which dairymen every where might derive instruction. 'One circumstance,' says he, 'goes a great way to explain the goodness of the North Wiltshire cheese, viz., the convenient situation of most of the farm-houses in the centre of the farm, so that all the cows can be driven home to milk, and all the milk can be put together, of an equal temperature, and, by beginning their work early, the dairymen can make cheese twice in the day. Where servants are sent to milk in detached and extensive pastures, this cannot be done. Bad cheese can generally be traced to some fundamental fault in the art of making it, and particularly in that essential article, the rennet.' We thus far agree with the author of the 'Survey;' that a great deal is to be attributed to bad management, but we are inclined to think fully as much, or even more, is connected with soil and pasture.

The quantity of cheese that is made from each cow in this district was greater than is common in any other cheese-making country; sometimes as much as 4½ cwt. or 5 cwt. per cow, seldom lower than 3 cwt. Perhaps 3½ cwt. is a fair average in a good cheese-making year on every cow that calves in proper time.*

South Wilts is a very different country. A considerable portion of it is occupied by extensive and open plains where sheep only will thrive. There are, therefore, comparatively few cattle kept in this district, and there would be still fewer were there not much wet and boggy ground in the valleys between the different elevations of Salisbury plain, and where sheep could not live.† The old Wiltshires never completely occupied the cow pastures of South Wilts. They were long-horns, but little care was taken about the breed.

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* The produce of cheese is, however, materially influenced by the season; Mr. Marshall gives an illustration of this in his 'Economy of the Midland Counties.' 'One year twenty cows produced four tons of factor's cheese, besides the expenditure of the family, making altogether upwards of 4 cwt. per cow; yet in the next year the same cows, with the addition of four or five more cows to the dairy, did not produce so much cheese.'

'The first summer was warm and moderately wet; neither too wet nor too dry; a happy mixture of warmth and moisture. The pastures were eaten level even to a degree of bareness, yet always wore a freshness, and the cows throughout the summer looked sleek and healthy. The next was a wet summer-'

† A writer in the Bath Society Papers, vol. vii. p. 170, very properly says, that 'the great error in this stock is the smallness of the quantity kept, the rage for fine sheep having almost driven the cow stock out of the district. South Wiltshire farms are not calculated to keep many cows, but the greater part of them would keep more than they do. Where there are water meadows cows are indispensably necessary to eat the after grass, and in winter they are always so to eat the barley-straw, and make dung. There is always as much distant land on a South Wiltshire farm as the sheep-fold can manure; the home land should be manured with hot dung, and particularly when in preparation for a turnip crop. If cows were formerly thought so useful as to be indispensable on the farms of this district, they must certainly be much more so now when their produce is worth one-third more.'

The cows are here as uniformly devoted to the production of butter, as those of North Wilts are to that of cheese, and with almost equal success, for the butter of South Wilts is in high repute. There is no particular description of cow in the one to produce butter only, and in the other to produce cheese, for the old breed in both is nearly gone. The short-horns have been introduced, and they remain in some cases pure, in others crossed in various ways with the native breed.* Mr. Davis accounts for this in the most satisfactory manner; 'perhaps it is custom or prejudice, and these producing greater skill in the manufacture of each in the respective districts.'

OXFORDSHIRE.

The improved short-horns lingered longer in Oxfordshire than in most of the districts which they had occupied. It has been stated, that Mr. Fowler, of Hollwright, derived his breed immediately from Mr. Bakewell and carried the improvement of the long-horn cattle to a greater extent than Mr. Bakewell did. His bull, Shakspeare, has been already described as the best stock-getter that the long-horn breed ever had. After Mr. Bakewell died, his stock began to lose its high character under the management of his nephew, Mr. Honeybourn; Mr. Fowler's cattle maintained their reputation for many years, until they, too, gradually yielded to the superior claims of the short-horns.

Before Mr. Fowler's time, Oxfordshire could not be said to have any peculiar breed, but the improved long-horns bred and patronised by him, speadily became the prevailing stock of the county. A few long-horns, but somewhat deteriorated, are yet to be found in Oxfordshire; the short-horn, or the half-horn, or a mixture between the short and the supposed native cow, principally prevail.

Sir C. Willoughby was one of the first who introduced the short-horn. He had a dairy of 19 cows of that breed. The very intelligent Secretary to the Board of Agriculture, the Rev. Arthur Young, (in his Survey of Oxfordshire, published in 1809,) could not quite reconcile himself to this intrusion, and speaks pointedly of the necessity of their being well fed and taken care of in the winter. This was a grand objection when they

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*'Few reasons need be adduced to prove that the best kind of cow for this district is that which will bear *hard keeping* best, and particularly that kind which will best bear wintering in a straw-yard.'—Bath Papers, vol. vii. p. 170.

The *cow-commons*, or *cow-downs* that used to be described by every statistical writer, and which were in a manner peculiar to the South Wiltshire and Hampshire Downs, are diminished in number, and in many parts of these districts they are no longer known. These commons were on the best and most level parts of the down lands. Mr. Marshall gives the following account of them. 'The cattle are collected in one common herd, each township or hamlet having their cow-herd, who drives them to the downs, tends them there, and brings them back in the evening to be milked, distributing them among their respective owners, who take the charge of them during the night. The herdsman collects them again in the morning, by sound of horn, a custom probably of many centuries standing. I have seen a hundred head at least in one of these town herds. In summer, when the weather is sultry, the cows remain in the house, or yard, and are fed there with grass and weeds collected for them, or are suffered to drop their dung unprofitably in lanes, and other shady places, and are driven to the downs in the cool of the evening.'

The stubble-fields being opened, they took possession of them also in common with the sheep. If there are common meadows, they have no exclusive right to feed on them until St. Martin's-day, when the owners take them home to the straw-yard. After the cows leave the cow-down to go into the stubble-field, it becomes common for the sheep-flock during all, or a certain part of the season, when it is again laid up for the cows.

were first brought into notice, but it was perfectly groundless, for they have thriven where many other breeds would have failed, and they are now finding their way into Scotland, to contend with the northern cattle on their own ground.*

WARWICKSHIRE.

We have recorded the name of Webster of Canley, in this county, as one of the earliest improvers of the long-horns. The prevailing breed of Warwickshire was, before his time, long-horned, and from the shape and size of the beasts, seemed to have been originally brought from Lancashire. Webster, however, began to work upon a better stock, for he obtained some cows from the banks of the Trent, at that time celebrated for the value of the cattle produced there. After Bakewell had traversed every part of the kingdom in order to select subjects on which to commence his experiments, he selected two heifers from Mr. Webster's dairy as the foundation of his future stock.

Mr. Gibbs, of Blackford, soon afterwards emulated the example of Webster, and produced a superior breed of cattle, hardy, short-legged, and wide and deep in their frame. He first hired bulls from Mr. Bakewell, and then bred from his own stock until he bought a bull that was bred by Mr. Meeks, after which he still further improved his cattle by crossing with Mr. Prince's long-horns.

Other breeders pursued the same laudable course, and the consequence was that the Warwickshire cattle would not yield to the improved Leicesters in any valuable point, but were acknowledged as genuine branches of the same stock. They also retained a considerable portion of all their sterling value when Mr. Honeybourn's stock had dwindled into mere shadows of what they once were.

At the present day, some long-horns are to be met with in Warwickshire, and the most valuable dairy breed is at least a mixture of the long with the short-horn. The short-horn is, however, gaining ground. Lord Clonmell had a fine breed of pure Durhams at his seat Chateau-Margeaux, some of which were afterwards purchased by Mr. King, then living at Amberslade House, in this county.†

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* The Secretary to the Board was always partial to the use of oxen at the plough, and on the road. The advantage and disadvantage to be derived from using them was in few places put more to the test of experience than in Oxfordshire, and the consequence was, that many farmers who had tried both the Devons and the Hereford, returned again to the use of the horse. Mr. Young, however, gives an account of the experience of others on the contrary side of the question, so interesting, that we are induced to quote a few paragraphs. ‘Mr. Thomas Latham, of Clifton, had a team of four oxen that drew with ease 10 quarters of wheat in a waggon; and which were far beyond horses for timber carting. They were Scotch beasts. He worked them three years, and sold them lean for 48*l*. They ploughed as well and as much as horses, and did not cost nearly so much. Mr. Foster, of Bignal, worked a team of five spayed heifers in harness. He began to plough with them at two years old; they were in full work at three; and fattened at seven. He had sold them as high as 100*l*. per pair. They were not shod, and although on this stone-brash surface, they worked as well as horses.

† Mr. Murray, who published a ‘Survey of Warwickshire,’ in 1813, gives the following estimate of the profit per acre, on different kinds of farms and differently managed.

		£.	*s.*	*d.*
‘Thin clay land, under the rotation of fallow, wheat, beans, barley, clover, and oats per acre	Loss.	0	1	6
‘Good clay land, on marl or limestone rock, same rotation	Gain.	2	14	9
‘Light, poor, sandy soil under the rotation of turnip, fallow; from turf, turnips eaten off by sheep, barley and seeds, clover eaten off by sheep	Gain	0	5	0
‘Red sandy loam under rotation of wheat, after leys, and the other crops, as in the last		2	8	2½
‘A grazing farm		3	4	0
‘Dairy farm		4	9	0

WORCESTERSHIRE.

This county cannot be said to have possessed any distinguishing breed of cattle. It was surrounded by breeding districts, but its own pasture was too good for the rearing of young stock, therefore it purchased from all around it, whether Herefords, or Shropshire, or Staffordshire, or Welsh. The few that are bred in the county are of a mixed character, or there is rarely any particular object of improvement in their selection, but chiefly to procure milk and butter and cheese for the supply of the district, and scarcely sufficient of either of them. The native cattle, however, are evidently long-horns, and are very fair milkers. In some of the dairies, there is a cross between them and the Holderness, and in a very considerable part of the county the pure short-horn is found, and begins to predominate as a dairy cow. The Herefords and the Durhams are struggling for superiority on the grazing lands, and are the prevailing breeds there, although the old Staffordshire is sometimes seen, and although much improved by a mixture of Herefordshire or Durham blood, yet not able to compete with either the Herefords or the Durhams. The pure Herefords are no where superior to what we find them on the pastures of Worcestershire. The most valuable cross is between the Hereford and the Durham, and the produce is equally good for the dairy and for grazing.

There is nothing peculiar in the management of cattle in Worcestershire. The calves are principally reared with skim milk, in some cases a little oil cake and linseed being added until the animal is three months old, when it is fed altogether upon grass. In summer, the cattle are fed in the usual way upon grass, and in winter on meadow hay, Swedish turnips and oil cake. We owe many thanks to Mr. Herbert, who, at the request of the Earl of Coventry favoured us with some valuable observations on the Worcestershire cattle.

Approaching nearer to the borders of Staffordshire, while we still have the Herefords and the Durhams, the old Staffordshire long-horns increase in number, and rise in favour with the grazier. The Staffordshire and the Durham are also crossed for the dairy, and with so much good effect, that they are the prevailing breed for that purpose, but the Hereford is here supposed to bear off the palm as a grazing beast, and will always obtain a greater price than either the Durham, or Staffordshire, or any cross between them. To our friend Mr. Rushton of Dudley, we are indebted for the suggestion of these hints.

The items of the two last are as follows:—	£.	*s.*	*d.*
'Rent	3	3	0
'Tithe, poor-rates, road duty, &c.	0	18	0
'Proportional expense of a man	0	5	0
	4	6	0
'Keep of six large sheep, at 25*s*.	7	10	0
'For interest of stock and risk	3	4	0
'If used as dairy expense as above	4	6	0
'Produce 2½ cwt. of cheese per acre, at 70*s*.	8	15	0
'Which leaves	4	9	0

'The butter and refuse of milk is supposed to pay all other charges.'

STAFFORDSHIRE.

The old Stafford cattle were a somewhat coarse kind of long-horns of middle size, of various colours, thick about the head, bad handlers, with no great aptitude to fatten, but excellent for the dairy. A few of them, and with very little improvement, are yet to be seen in the possession of the cottager and small farmer. The first attempt at improving them was the introduction of the Dishley breed; and when Mr. Bakewell's cattle were most in repute crosses between the old Staffordshire and the improved Leicester were carried to a very considerable extent. The size of the animal was increased, his form materially improved, and a disposition to fatten, before unknown, was given to him. It was, however, asserted by those of the old school, that these improvements were purchased at the expense of other qualities, even more valuable in a dairy country; the milk was probably enriched, but it was materially diminished in quantity, and the same weight of cheese was not obtained; and, therefore, they bred back again to a certain degree; the milking properties of the native cattle were restored, while superior form, and size, and grazing properties, were to a considerable extent retained.

The Staffordshires had now become an exceedinly valuable breed; they were much prized in the neighbouring counties, and great numbers of them were annually sent to supply the dairies of North Wiltshire. On the borders of Cheshire, cheese was produced equal to the finest of that county; and on the Derbyshire side, the production of that district was fairly rivalled, while the cows, the dairy work being done, were superior to those of the former county, and not inferior to those of the latter, in the tendency to fatten.*

Some of them, a better kind of cattle than the long-horn of the cottager just described, but still under the name of the 'old Staffordshire long-horns,' continue to be bred in some parts of the county. Among others, Mr. R. Wood, of Old Wood, near Rudgely; Mr. Parton, Bromley-Hurst near do.; Mr. Holland, Lee-Lane, near do.; Mr. Bakewell Oak-Fields, near do.; Mr. Brown, Farewell, near Litchfield; Mr. Ashmell, do.; all breed exclusively from the long-horns. Mr. Bakewell is President of the Rudgely Agricultural Society.

Mr. Friend, V. S., of Walsal has favoured us with the following account of these old Staffordshires of the present day. 'The prevailing colours of the long-horns are grizzled or brindled with an irregular broadish streak of white running nearly the whole length of the back; and even in those that differ from this description, there is an irregularity and brokenness in the colours, and it is very rare indeed to see one with the plain and somewhat uniform patches of colour, so common in the short-horned cattle of the Durham breed. Whole-coloured ones also are very scarce. The horns are very long and wide apart, and from the setting on of them, they run back some considerable way before projecting forward to form the curve. In addition to this, the eye is small and deep in the socket, the arch of the orbit is very broad and prominent, giving altogether a peculiar look of width and plainness to the countenance; certainly not pleasing at first sight, yet mingled in most instances with something of gentleness and meekness very characteristic of the animal.

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* Mr. Marshall gives a singular account of the method of rearing calves in his time, in this district. 'Calves are here fatted at the teat, and in the early part of the season are kept to a good age; but cheese-making once begun, they are butchered as they drop, at not more perhaps than three or four days old, nor at more perhaps than three or four shillings price. The market, the manufacturing towns and the collieries of Staffordshire.

'The only circumstance relative to the management of fatting calves which requires notice, is an expedient used by some individuals—but not, I believe, in universal practice—to make them be quiet, and more especially during the temporary scarcity of milk which will sometimes take place. In this case, balls made of wheat flour, and a sufficient quantity of gin to form it into a paste, are given them; three balls about the size of walnuts being given about a quarter of an hour after each meal. The effect is, that instead of wasting themselves by incessant bawling, they lie quiet, sleeping a principal part of their time. By a little custom, the calves get fond of these paste-balls; eating them freely out of the hand—a proof of their being acceptable to their stomachs. As an *expedient* they are evidently eligible, and may be of service to a restless calf even when milk is plentiful.'—Midland Counties, vol .i. p. 350.

‡ On the use of this *paste* or *gin-ball* when calves are taken a long way from one market to another, we have already spoken, in the account of Northamptonshire.

'They are short and coarse on the leg, rough in the hide, and not generally good handlers; though the hide, from its thickness and weight, is valuable to the butcher and tanner. As feeders, they do not average great weights, varying from about 40 to 70 stones of 14 lbs. to the stone. They are deep in the brisket, and the fore-quarters weigh heavy. They are, generally speaking, very quiet and docile, not disposed to break pasture, and kept in bounds by small fences. The milk is rich in quality, and will make proportionably more butter and cheese, though it is acknowledged they will not give so much in quantity as the short-horns will, both living well alike. They are said to require a less quantity of food, though I am convinced they will not do on that of a worse quality than the others, from what I saw at Lord Bagot's, at Blythfield Park. He had a number of long-horned and Hereford cows, each good of their kind, tied up in the same range of building, and the bailiff informed me that the Herefords had been eating hay inferior to that eaten by the long-horns, and yet the Herefords beat them decidedly in condition. They work a number of bullocks on the farm; and he told me also, that he had tried the long-horns for this purpose, but found them not at all equal to the Herefords, either in pace or in capability of enduring fatigue. The long-horns are still very hardy in constitution, and, from the coarseness of their hides, are calculated to bear inclement weather better than the short-horns, and this, added to the shortness of their legs, gives them the decided advantage in rough weather and a bare pasture.'

At length the short-horn, in the course of its triumphant career, reached the borders of Staffordshire, and some spirited breeders immediately put their boasted value to the test. Some of the best short-horn bulls were procured, and the Staffordshire cow was crossed by them. Various degrees of success attended these crossings, according to the skill with which they were conducted, and, on the whole, the symmetry of the animal was considerably increased; the weight and disposition to fatten were increased too; a twelvemonth was gained in point of ripeness for the butcher, the quantity of milk was greater, and to an extent which rendered it more profitable to dairymen, although it might be somewhat diminished in quality, and a very profitable breed this seemed to be.

It may, however, be imagined that the Staffordshire farmers were a little jealous of this innovation, and many of them clung tenaciously to their favourite breed; but, at length experience convinced them that greater improvement was effected in their cattle by the introduction of the short-horns, than the Leicesters of Bakewell had ever been able to effect; so that the improved Staffordshires soon became even more rare than the old natives, and a cross between the long-horn and the short prevailed in most of the dairies in the southern part of the county.

It was, however, necessary to have frequent recurrence to the short-horn bull, in order to preserve the full advantage of the cross, for otherwise the long-horn gradually returned, and deprived of some of his excellent points.

In the south of Staffordshire, therefore, this breed might have been considered as fully established, had not some enterprising agriculturists, induced by the advantage which a mixture with the short-horn seemed to bestow, introduced the pure short-horn breed. The common Yorkshire milch cow, with a little admixture of the new Durham blood, was tried, and especially upon good land. There she perfectly answered the farmer's purpose, and on the better kind of pastures she is rapidly gaining ground; but on the poorer soils, the long-horns, or the half-horns, are most profitable, and continue to be retained. Sir John Wrottesley has a dairy of twenty-five cows at Wrottesley Park, of the Holderness breed, with Durham bulls;* other breeds have been tried, and have their patrons.

Lord Bagot still retains the long-horns, and in their purest state.

The late Lord Anson had a fine breed of white cows, which he changed for the Staffordshires improved by the Leicesters, and which he afterwards parted with, and adopted the Devons. Mr. Tollett, of Betley, had also Devons, and so had Mr. Childe, who selected them with great care, and sold them for very high prices at an annual fair. Sir George Pigott has a dairy of Galloways at Pateshall, and farther in the north, Lord Talbot has a noble stock of Herefords.

Sir John Wrottesley once crossed his heifers with a French bull. The produce was very beautiful, and fattened very quickly and well, but when slaughtered, the meat was of a bad colour.

Towards the north of the county, the long-horns continue to maintain their ground, and particularly on the banks of the Dove and the Trent which separate Staffordshire from Derbyshire. A cross between the Derby and Staffordshire cattle there prevails. The fore-end is fine, long, and standing low. The head small, the neck thin, but deep according to the depth of the bosom. The shoulders fine, the rib full and the loin broad. The thighs remarkably thin below, as if to give room for the bag, which is large, clean, and bladder-like, with long teats, and remarkably large and elastic milk veins. The leg short, with the bone fine. The flesh good. The hide of a middle thickness. The colour of a brindled mottle, with a fine back and white legs. In temper very gentle, a quality of considerable value in a cow intended for the pail.

The principal difference between this and the improved long-horn is, that the former is more roomy and better let down in the chest; the latter, better topped, fuller on the chine and loin, and generally fuller on the thigh. Both are clean in the fore-end and shoulder; the bone of both is fine and the flesh good; but the one loses her milk a few months after calving, the other will milk all the year round.

There is no peculiarity of management in Staffordshire, as it regards either the calf or the adult animal. We beg leave to return our acknowledgments to the Earl Talbot, and Sir John Wrottesley, for the kindness with which they furnished us with information on several important points.

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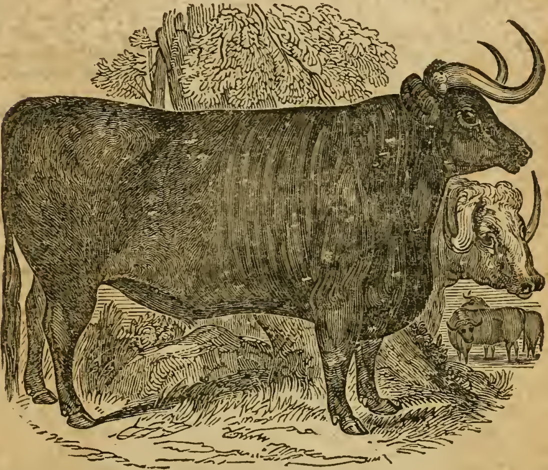
* For this mixture of the Durham with the Holderness, he very satisfactorily accounts, in a letter which we have had the honour to receive from him. 'I do not believe,' he says, 'that a very good milker will have the same disposition to fatten as a bad one, and *vice versâ;* added to which, the heifers that have a great disposition to feed are indisposed to breed. This circumstance has induced me not to covet very high-bred animals, and to sacrifice a small portion of the milk to assist in feeding, when too old to continue in the dairy.'

Mr. Careless, Mr. Ford, of Synnerton, and Mr. Myer, of Newcastle, will also receive our thanks.

SHROPSHIRE.

The old Shropshire cattle, with a cut of one of which we are enabled to present our readers, was of a long-horn hardy kind—of all colours, but generally brown mixed with bay and white, and with a streak of white running along the back and under the belly. They were raw-boned, cow-legged, and far from being handsome; bearing a general resemblance to the cattle scattered through Warwickshire and Staffordshire. They were, however, good milkers and fit for the dairy.



[*The Old Shropshire Ox.*]

Very few of the old sort are now left, but a cross between the Shropshire and the Holderness has been established, by which increase of size has been obtained, hardihood, and a greater quantity of milk. They are very docile; and when red or spotted they are in great request: the spotted are accounted the most valuable. This cross, however, should be kept on good sound land; on wet marshy land the old Shropshires are the best. The cows sell well in spring, having calved, or being near to the calving time. The price of one of average goodness will be from 14*l.* to 18*l.*, while a cow of the old Shropshire kind, and of the same age and size, would not bring more than from 9*l.* to 12*l.* They are more profitable for the butcher. They feed quickly on good pasture, and the beef is good.

The Herefords are established through the whole of Shropshire; they are occasionally seen in the dairy, and they occupy the greater part of the grazing grounds.

A few Montgomeries with smoky faces, and also some other Welsh breeds, are kept in some parts of Shropshire, but they are generally in the hands of cottagers and small farmers, who purchase them because they are hardy, and will weather the winter on inferior keep better than most other breeds. Great numbers of them pass through Shropshire in their way to the southern counties. The short-horns, and principally the Holderness with a slight cross of the Durham, are now to be found in various parts of Shropshire; and the prejudice against their tenderness, and the poverty of their milk, is wearing away.

CHAPTER VII.

THE SHORT-HORNS.

For every portion of the text in this excellent account of the Short-Horns; we are indebted to the Rev. Henry Berry, than whom there are few more zealous breeders of cattle, while there is no better judge of them.

Whatsoever differences of opinion may prevail respecting the comparative merits of our several breeds of cattle, it must be admitted that the short-horns present themselves to notice under circumstances of peculiar interest. Possessing in an eminent degree a combination of qualities which have generally been considered incompatible, and rendered irresistibly attractive to the eye by their splendid frames, and beautifully varied colours, it is not surprising that they have become objects of public curiosity; that they have realized for their breeders enormous sums of money; and that, throughout our own island, and in every foreign country where agriculture is attended to, they are in increasing request.

It might tend to throw much light on the science of breeding, could these animals be traced, in the progress of their improvement, to an earlier period than has hitherto been found possible. Of the extent of that improvement we may, however, form an estimate, by placing together one of the improved, and one of the unimproved race. We should, in such a case, discover resemblance just sufficient to support the belief in a very remote alliance, but there all similarity would cease.

From the earliest periods as to which we have any accounts of our breeds of cattle, the counties of Durham and York have been celebrated for their short-horns, but principally, in the first instance, on account of their reputation as extraordinary milkers.* To recite their recorded feats at the pail would be to invite incredulity; but it may be asserted, on the best evidence, that, taken as a breed, they have never in this particular been equalled. The cattle so distinguished were always, as now, very different from the improved race. They were generally of large size, thin skinned, sleek-haired, bad handlers, rather delicate in constitution, coarse in the offal, and strikingly defective in the substance of girth in the fore-quarters. As milkers, they were most excellent, but when put to fatten, as the foregoing description will indicate; were found slow feeders; producing an inferior quality of meat, not marbled or mixed as to fat and lean, and in some cases, the latter was found of a particularly dark hue. Such, also, are the unimproved short-horns of the present day, and the distinction cannot be too frequently asserted, because they are, in many cases, considered as specimens of the improved breed, and have actually been resorted to in trials as to the comparative aptitude of animals to fatten—trials which it is evident they could not successfully sustain.

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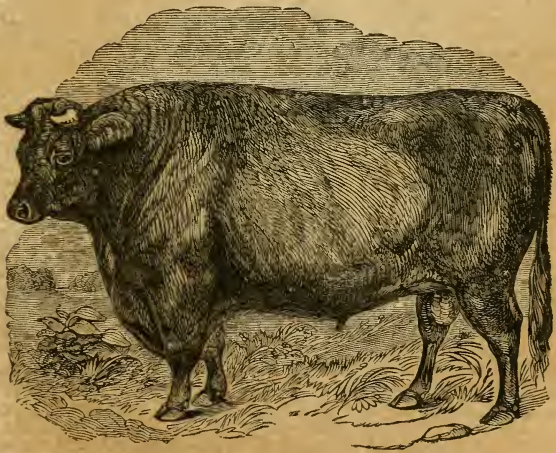
* Before this a large and valuable description of cattle had existed on the western coast of the continent of Europe, and extending from Denmark to the confines of France. They were celebrated for the great quantities of milk which they yielded, and some of them exhibited an extraordinary aptitude to fatten. At what particular time they found their way to England, or by whom they were imported, is unknown; but there is a tradition that, towards the close of the seventeenth century, a bull and some cows were introduced into Holderness.

In external form, there appeared to be very little to recommend them, for they had large shoulders and coarse necks; the sides were flat, and the head was thick; all the coarse parts were bulky, and the prime ones were reduced in size, and they were almost the reverse of what the agriculturist would select: they were, however, bulkier than the native breeds, and they were better milkers than the generality of the cattle of that day. They would, by dint of feeding, grow to an enormous size, but they had not the aptitude to fatten, nor the early maturity, to which they have been since indebted for the triumph over every other breed.—*Edit.*

A period of more than eighty years has now elapsed, since the short-horns, on the banks of the river Tees, hence called the Teeswater breed, had assumed a very different character to that contained in the foregoing description. In colour, they resembled the improved short-horns, being occasionally red, red and white, and roan, though the last-named colour was not then so prevalent as now. They possessed a fine mellow skin and flesh, good hair, and light offal, particularly wide carcasses, and fore-quarters of extraordinary depth and capacity. Perhaps no closer modern resemblance can be found to the above description of the Teeswater breed than Mr. Berry's bull presents, the portrait of which accompanies this account. His dam was purchased by Mr. B. on account of the very few crosses that intervened between her and some of the best of the Teeswater cattle, to which he was desirous to go back on account of the extent to which breeding *in and in* has been carried. When slaughtered, their proof was extraordinary, and many instances are recorded of the wonderful weight of their inside fat.



[*Portrait of Rev. Henry Berry's Bull.*]

The remarkable difference which existed between the Teeswater and the old unimproved short-horns may, with propriety, be ascribed to a spirit of improvement which had some time manifested itself among the breeders on the banks of the Tees, whose laudable efforts were well seconded by the very superior land in the vicinity of that river. No reasonable doubts can be entertained that they proceeded on a judicious system of crossing with other breeds, because it was utterly impossible to raise such a stock as the Teeswater from pure short-horn blood. One cross to which they referred was, in all probability, the white wild breed; and if this conjecture be well-founded, it will be apparent whence the short-horns derived a colour so prevalent among them.

It is also asserted that, about the period in question, Sir William St. Quintin, of Scampston, imported bulls and cows from Holland, which were crossed with the stock of the country. It would tend to little advantage to proceed with conjectures, as to what other breeds were resorted to, if any: this much is certain, that great improvement was soon manifested, and a valuable variety established, as the two following instances will prove.

Mr. Milbank, of Barmingham, one of the leading improvers, bred and slaughtered an ox, which, at five years old, weighed four quarters, one hundred and fifty stones, of fourteen pounds to the stone, producing sixteen stones of tallow; and a cow bred from his stock, slaughtered by Mr. Sharter, of Chilton, at twelve years old, weighed upwards of one hundred and ten stones.

From Mr. Milbank's time, the Teeswater cattle continued to sustain their excellence and celebrity in various hands, until Mr. Charles Colling adopted them, when he manifested a superiority of skill as a breeder, which, in a very brief period, secured him an ample fortune.

Whatever had been the merits of the Teeswater cattle, it is certain Mr. Colling greatly improved them; and though it has been asserted that his success was the result of chance, arising from the possession of an animal, with the merits of which, it is supposed, he was at one period unacquainted, the writer of this article is of opinion that Mr. Colling's success resulted from a deliberate and well-considered plan. He found the Teeswater, like all other extravagantly large cattle, frequently of loose make and disproportion. He was sensible, also, of the difficulty of breeding, with anything like certainty, *large good* animals; and though he has declined on all occasions to throw any light on his views and proceedings, the writer thinks he can detect, in the very outset, and through the progress of his practice, a resolution to reduce the size of this breed, and at the same time, and by that means, to improve its form. This he is supposed to have effected in the first instance, through the medium of a bull, called '*Hubback*,' an animal respecting which there has been much controversy, principally touching the purity of his blood, a question now of little importance, because it is admitted on all hands that Mr. Colling adopted another cross, which prevails in a majority of superior short-horns of the present day. It may, notwithstanding, be matter of interest to state a few particulars respecting this bull.

Without entering on an inquiry by what circumstances Hubback's title to be considered of pure blood is supported or weakened, it may suffice to observe, that it appears probable he possessed on one side the imported blood. The possessor of his dam was a person in indigent circumstances, and grazed his cow in the highways. When afterwards she was removed to good land, near Darlington, she became so fat that she did not again breed; and her son, having the same feeding propensity in a high degree, was useful as a bull during a very short period. The quality of his flesh, hide, and hair, are supposed to have been seldom equalled; and as he was smaller than the Teeswater cattle, he was eminently calculated to forward Mr. Colling's views.

It has been remarked that we have at present no superior horse on the turf, which does not boast the blood of the Godolphin Arabian; so it may be asserted that we have no superior short-horns which do not claim descent nearly, or remotely, from Hubback.*

After the use of this bull, Mr. Charles Colling proceeded with singular success to produce, from time to time, superior animals; and the number of bulls he disposed of by letting was highly encouraging. But the circumstance which brought the improved short-horns into most extensive notice was the production of the 'Durham Ox,' an animal which speaks volumes in favour of even a single cross of this blood; for the ox was the produce of a common cow, which had been put to '*Favourite.*' At five years old, the Durham ox was sold to Mr. Bulmer, of Harmby, near Bedale, for public exhibition, at the price of 140*l.*: this was in February, 1801. He was at that time computed to weigh 168 stones, of 14lb., his live weight being 216 stones, and this extraordinary weight did not arise from his superior size, but from the excessive ripeness of his points. Mr. Bulmer having obtained a carriage for his conveyance, travelled with him five weeks, and then sold him and the carriage, at Rotherham, to Mr. John Day, on the 14th May, 1801, for 250*l.*

	£.	*s.*	*d.*
On the 14th of May, Mr. Day could have sold him for	525	0	0
On the 13th of June, for	1000	0	0
On the 8th of July, for	2000	0	0

Mr. Day travelled with him nearly six years, through the principal parts of England and Scotland, till at Oxford, on the 19th February, 1807, the ox dislocated his hip-bone, and continued in that state till the 15th April, when he was obliged to be slaughtered, and, notwithstanding he must have lost considerably in weight, during these eight weeks of illness, his carcass weighed—

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* This is true, because Hubback was the sire of the dam of Mr. Charles Colling's bull, Foljambe, who was the grand sire of Favourite; and there can be no doubt that there has not been for many years any superior short-horn who was not descended from Favourite. Mr. Charles Colling is said to have considered that the bull, Foljambe, was the one who did his stock the greatest good; and this is not improbable, as Foljambe was the sire both of the sire and dam of Favourite. Hubback, however, must have been a remarkably good animal, and considering the short time during which he was used as a bull, proved himself a first-rate stock-getter.

The following account of 'Hubback' we had from Mr. Waistell, of Alihill, who, although his name does not appear conspicuously in the 'Short-Horned Herd Book,' deserves much credit for his discrimination here. He used to admire this calf, as he rode almost daily by the meadow in which it grazed; and at length he attempted to purchase it from the owner. The price asked, 8*l.* seemed much for a calf not a year old; and the reputation of the short-horns not being yet established, the bargain was not struck. Still he longed for the young beast; and happening to meet Mr. Robert Colling near the place, he asked his opinion of the animal. Mr. Colling acknoweledged that there were some good points about him; but there was something in his manner of acknowledging this, which induced Mr. Waistell to suspect that Mr. Colling thought somewhat more highly of the calf than his language expressed, and, therefore, he hastened the next morning, concluded the bargain, and paid the money. He had scarcely done so before Mr. R. Colling arrived for the same purpose, and as the two farmers rode home together, they agreed that it should be a joint speculation.

Some months passed by, and either Mr. Waistell's admiration of the calf a little cooled, or his partner did not express himself very warmly about the excellences of the animal, and Messrs. Waistell and R. Colling transferred young Hubback to Mr. C. Colling; who, with the quick eye of an experienced breeder, saw the value of the little beast. Mr. Waistell expressde to us (October, 1832) his regret (natural enough) at having been induced to part with the sire of the short-horns, and his extreme disappointment that when Hubback began to cover, Mr. Charles Colling confined him to his own stock, and would not let him serve even one of Mr. Waistell's cows.—*Edit.*

	Imp.-stones.	lbs.
Four quarters	165	12
Tallow	11	2
Hide	10	2

This was his weight at eleven years old, under all the disadvantages of travelling in a jolting carriage, and eight weeks of painful illness. Had he been kept quietly at Ketton, and fed till seven years old, there is little doubt but he would have weighed more than he did at ten years old, at which age Mr. Day stated his live weight to have been nearly thirty-four hundred weight, or two hundred and seventy stones, from which, if fifty be taken for offal, it leaves the weight of the carcass two hundred and twenty stones.

It is a well-ascertained fact, that, during his career as a breeder, Mr. Colling tried several experiments in crossing, and the breeds to which he resorted on these occasions, being very considerably smaller than the short-horns, this circumstance tends to corroborate the writer's opinion that he considered it desirable to reduce their size. The cross with the Kyloe led to no results worthy enumeration, but that with the *polled Galloway* must not be passed over without comment. Before stating the circumstances attending this experiment, it may be proper to observe that no breed of cattle promised so successful a cross with the short-horns as the Galloway. They were calculated, by their deep massive frames and short legs, to bring the short-horns nearer the ground, and to dispose their weight in a more compact manner: their hardy habits would be essentially useful, and the quality of their flesh and hair were such as to render the experiment still more safe. Add to this, that they could be obtained of a red colour; and we are prepared to admit, even without the sanction of a successful experiment, that they were admirably adapted to cross with the short-horn, standing frequently too high from the ground, not very well ribbed home, and not seldom of loose, disjointed frame.

To this breed Mr. Colling resolved to resort; and though at the time when he did so, the event was regarded with some degree of ridicule by the pure-blood advocates, and comments passed which would have deterred ordinary men from the exercise of their judgment, Mr. Colling persisted.

He was much favored by circumstances in promoting his object, which was to take one cross, and then breed back to the short-horn—the only course, by the way, in which crossing can be successfully adopted. To breed from the produce of a cross *directly among themselves* will lead to the results which have induced many persons, without due consideration, to believe conclusive against crossing; but to take one cross, and then return and adhere to one breed, will, in the course of a few generations, be found to stamp a variety with sufficient certainty.

Mr. Colling's short-horned bull *Bolingbroke* was put to a beautiful red-polled Galloway cow, and the produce, being a bull-calf, was, in due time, put to *Johanna*, a pure short-horn—she also produced a bull-calf. This grandson of Bolingbroke was the sire of the cow, *Lady*, by another pure short-horned dam, and from Lady has sprung the highly valuable family of improved short-horns, termed, in reproach, the *alloy*. How far the alloy was derogatory, let *facts* testify.*

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* The dam of Lady was also the dam of the bull Favourite; and as the grandson of Bolingbroke is not known to have been the sire of any other remarkably good animal, it is most probable that the unquestionable merit of Lady and her descendants is to be attributed more to her dam than to her sire.—*Edit.*

It will probably be admitted that the prejudice against this cross was at the highest at the time of Mr. Charles Colling's sale. The blood had then been little, if at all, introduced to other stocks, and it was manifestly the interest, whatever might be the inclination, of the many breeders who had it not, to assume high ground for the pure blood, and to depreciate the alloy. Under these untoward circumstances for the alloy, what said public opinion, unequivocally certified by the stroke of the auctioneer's hammer? *Lady*, before-mentioned, at fourteen years old, sold for two hundred and six guineas. *Countess*, her daughter, nine years old, for four hundred guineas. *Laura*, another daughter, four years old, for two hundred and ten guineas. *Major* and *George*, two of her sons, the former three years old, the latter a calf, for two hundred guineas, and one hundred and thirty; besides a number of others, more remotely descended from Lady, which all sold at high prices—in fact, in a sale of forty-eight lots, realizing £7115 17*s*. Lady and her descendants sold for a larger sum than any other family obtained.*

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* The whole particulars of this first grand sale of short-horn stock ought to be preserved. We extract it from Mr. Bailey's Survey of Durham.

'*A Catalogue of Mr. C. Colling's Sale of improved Short-Horned Cattle, October 11th*, 1810.

COWS.

Names.	Out of	Got by	Cow's Age.	Bulled by	Sold for. *Gs.*	Bought by
Cherry	Old Cherry	Favourite	11	Comet	83	J. D. Nesham, Esq., Houghton-le-Spring, Durham.
Kate		Comet	4	Mayduke	35	Mr. Hunt, Morton, Durham.
Peeress	Cherry	Favourite	5	Comet	170	Major Rudd, Marton, Yorkshire.
Countess	Lady	Cupid	2	Do.	400	Do.
Celina	Countess	Favourite	5	Petrarch	200	Sir H. Ibbetson, Bart., Denton Park, Yorkshire.
Johanna	Johanna	Do.	4	Do.	130	H. Witham, Esq., Cliff Hall, Yorkshire.
Lady	Old Phœnix	A grandson of Lord Bolingbroke	14	Comet	206	C. Wright, Esq., Cleasby, Yorkshire.
Catheline	A daughter of the dam of Phœnix	Washington	8	Do.	150	G. Parker, Esq., near Malton, Yorkshire.
Laura	Lady	Favourite	4	Do.	210	Mr. Grant, Wylam.
Lily	Daisy	Comet	3	Mayduke	410	Major Rudd, Lincolnshire.
Daisy	Old Daisy	A grandson of Favourite	6	Comet	140	Major Bower, Welham, Yorkshire.
Cora	Countess	Favourite	4	Petrarch	70	G. Johnson, Esq., near Scarborough.
Beauty	Miss Washington	Marsh	4	Comet	120	C. Wright, Esq.
Red Rose	Eliza	Comet	4	Mayduke	45	W. C. Fenton, Esq., near Doncaster.
Flora		Do.	3	Do.	70	Earl of Lonsdale.
Miss Peggy		A son of Favourite	3	Comet	60	O. Gascoigne, Esq., Parington, Yorkshire.
Magdalene	A heifer by Washington	Comet	3	Do.	170	—— Champion, Esq., Blyth, Notts.
					2669	

As a specimen of the alloy, the reader is referred to this portrait of Mr. Berry's cow. It was taken three days before she calved, and exhibits her

BULLS.

Names.	Age.	Out of	Got by	Price. Gs.	Bought by
Comet	6	Phœnix . . .	Favourite .	1000	Messrs. Wetherill, Trotter, Wright, and Charge, near Darlington.
Yarborough . . .	9	. . . .	Do. . . .	55	A. Gregson, Esq., Lowlinn, Northumberland.
Major	3	Lady	Comet . . .	200	Mr. Grant, Wyham.
Mayduke	3	Cherry . . .	Do.	145	—— Smithson, Esq.
Petrarch	2	Old Venus .	Do.	365	Major Rudd.
Northumberland	2	. . . .	Favourite .	80	Mr. Buston, Coatham. Durham.
Alfred	1	Venus . . .	Comet . . .	110	Mr. Robinson, Acklam, Yorkshire.
Duke	1	Duchess . .	Do.	105	A. Compton, Esq., Carham, Northumberland.
Alexander	1	Cora	Do.	63	Mr. Fenton.
Ossian	1	Magdalene	Favourite .	76	Earl of Lonsdale.
Harold	1	Red Rose .	Windsor . .	50	Sir C. Loraine, Northumberland.
				2249	

BULL-CALVES, UNDER ONE YEAR OLD.

Names.	Out of	Got by	Price. Gs.	Bought by
Ketton	Cherry	Comet . .	50	Major Bower.
Young Favourite	Countess . . .	Do. . . .	140	——Skipworth, Esq., Lincolnshire.
Geerse	Lady	Do. . . .	130	——Walker, Esq., Rotherham.
Sir Dimple . . .	Daisy	Do. . . .	90	T. Lax, Esq., Ravensworth.
Narcissus	Flora	Do. . . .	15	Mr. Wright.
Albion	Beauty	Do. . . .	60	T. Booth, Esq., Catterick.
Cecil	Peeress	Do. . . .	170	H. Strickland, Esq., Boynton, Yorkshire.
			665	

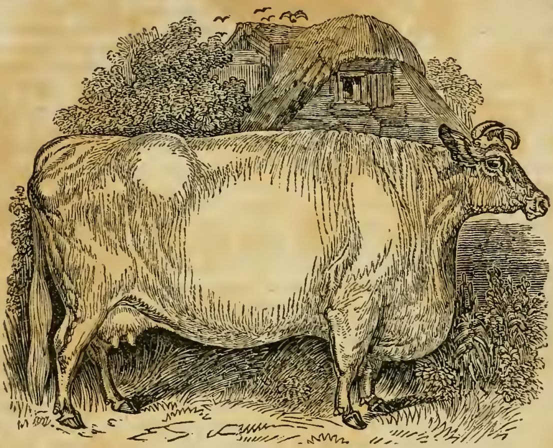
HEIFERS.

Names.	Age.	Out of	Got by	Price. Gs.	Bought by
Phœbe	3	Dam by Favourite . .	Comet	105	Sir H. Ibbetson.
Young Duchess	2	Do.	Do.	183	T. Bates, Esq., Halton Castle, Northumberland.
Young Laura . .	2	Laura	Do.	101	Earl of Lonsdale.
Young Countess	2	Countess	Do.	206	Sir H. Ibbetson.
Lucy	2	Dam by Washington	Do.	132	Mr. Wright.
Charlotte	1	Catheline	Do.	136	Mr. R. Colling.
Johanna	1	Johanna	Do.	35	G. Johnson, Esq.
				808	

HEIFER-CALVES, UNDER ONE YEAR OLD.

Names.	Out of	Got by	Price. Gs.	Bought by
Lucilla	Laura	Comet . .	106	Mr. Grant.
Calista	Cora	Do. . . .	50	Sir H. V. Tempest, Bart., Winyard, Durham.
White Rose . . .	Lily	Yarbro' .	75	Mr. Strickland.
Ruby	Red Rose . . .	Do. . . .	50	Major Bower.
Cowslip	. . . .	Comet . .	25	Earl of Lonsdale.
			306	

usual condition. She gives a moderate quantity of particularly rich milk.



[*Tee Rev. H. Berry's Cow.*]

It would answer no useful purpose, and would certainly be an objectionable course, to bring under particular notice any one or more of the highly valuable stocks of improved short-horns of the present day. To enumerate all would be impossible; and the writer of this account would most studiously avoid any partial or invidious comparison. The same objection does not however exist as to a remote period; and it is but justice to state that Mr. Robert Colling, brother of Mr. Charles, (who certainly was the leader, and surpassed all competitors in the improvement of the short-horns,*) Mr. Charge of Mewton, near Darlington, and

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From the above it appears that

	£.	s.	d.
17 cows were sold for	2802	9	0
11 bulls	2361	9	0
7 bull-calves	687	15	0
7 heifers	942	18	0
5 heifer-calves	321	6	0
In all 47 were sold for	7115	17	0

* Mr. Robert Colling's stock was not sold off until the 29th September 1818, when the following great prices were obtained for some of his cattle, a sufficient proof of the estimation in which they were held:—

One 2-year old cow	sold for	331	guineas
One 4-year old cow	"	300	"
One 5-year old cow	"	370	"
One 1-year old bull-calf	"	270	"
One 4-year old bull	"	621	"

It appears by the catalogue, with printed prices affixed, that

34 cows	sold for	4141	guineas.
17 heifers	"	1287	"
6 bulls	"	1343	"
4 bull calves	"	713	"
61 head of cattle	"	7484	"

Ten days afterwards, General Simson's stock of the same breed were sold at his seat

Mr. Mason, of Chilton, in the county of Durham, were only second to Mr. Charles Colling in his interesting and useful pursuit. Mr. Mason started early with animals derived, it is believed, from Mr. Colling, in the very commencement of his career; and Mr. Charge, who had long possessed a most valuable stock of Teeswater cattle, had at an early period crossed them with Mr. Colling's best bulls, and was one of the spirited purchasers of Comet, at a thousand guineas. Mr. Mason's late successful sale sufficiently stamps the value of his stock at that period, but, it is generally admitted, the system of crossing with other herds, which he had of late years judiciously adopted, proved highly instrumental in restoring those qualities in his own, which too close breeding had in some degree threatened to deprive them of.

It would be unfair, on this occasion, to omit mention of a veteran breeder, to whom the advocates for the preservation of pedigree are indebted for the 'Short-horn Herd Book'—Mr. George Coates. He is now one of the oldest authorities on the subject in existence, and was once the possessor of a very superior race of short-horns, though somewhat coarse. Portraits have been preserved of some very fine animals bred by him; and he had the solid satisfaction to dispose of his bull *Patriot* for five hundred guineas.

Mr. Coates fell into an error, but too common, and generally equally fatal: he fancied his own stock the best, and disdained to cross them with Mr. Colling's; which, as others afterwards proved, would have been a most judicious proceeding. The consequence was, Mr. Colling's sale having settled the public judgment and taste, Mr. Coates's stock fell into disrepute. If an apology be requisite for this statement of an undeniable fact, it will be found in the utility of holding up such an example as a caution to those who may be in danger of falling into a similar error.

It is considered that the specimens already appealed to, and the fine animals whose portraits accompany this account, the property of the noble President of the Smithfield Club, will render superfluous any attempt more particularly to describe the short-horns. Of course they will be found to vary greatly; but sufficient may be collected from what is presented to the reader to inform him as to the character of this superior breed of cattle.* The next object, then will be to show their capabilities to make a return for food consumed, and the unparalleled early period at which such return may be made. Indeed, *early maturity* is the grand and elevating characteristic of the short-horns, and their capacity to continue growing, and at the same time attaining an unexampled ripeness of condition at an early age, has excited the wonder, and obtained the approbation, of every looker-on not blinded by prejudice.

In order to do justice to the subject, and to show that these properties are not all of recent acquirement, but were possessed in an eminent degree by the Teeswater cattle, as well as the improved short-horns, it will be requisite to return to the former for a few facts in evidence.

About fifty years ago, Sir Henry Grey (of Howick) bred two oxen, which were fed by Mr. Waistell, and when six years old weighed 130 stones each, 14lb. to the stone; their inside fat being most extraordinary.

A heifer, three years old, bred by Miss Allen (of Grange), fed on hay and grass alone, weighed 90 stones.

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at Pitcorthie, Fifeshire. As a proof of the established reputation of the short-horns, even so far north, and the degree to which they would even then thrive, in a climate so different from their native one, it may be stated that 12 cows, 5 two year old heifers 3 bull-calves, 7 bulls, 4 one-year old heifers, and 6 quey calves, 37 in all, sold for 1388 guineas, or nearly 40*l.* per head.

* For portraits of Lord Althorp's cow and heifer, see pp. 236, 237.

Two three years'-old steers, bred by the same lady, and similarly fed, weighed respectively 92 and 96 stones.

Mr. Waistell's four years'-old ox, by the bull supposed to be the grandsire of Hubback, weighed 110 stones.

A four years'-old ox, bred by Mr. Simpson (of Aycliffe,) fed on hay and turnips only, weighed 135 stones.

About the same period, a five years'-old heifer, bred by a bishop of Durham, weighed 110 stones.

A cow of Mr. Hill's, slaughtered in Northumberland, weighed 127 stones.

Mr. George Coates, before-mentioned, slaughtered a heifer, by the supposed sire of Hubback, which, fed on turnips and hay, weighed, at two years and two months old, 68 stones.

An ox and heifer, bred by Mr. Watson (of Manfield,) weighed, at four years old, within a few pounds, 110 stones each.

A sister to Mr. G. Coates's *Badsworth*, having run with her dam, and fared as she did, without cake or corn, met with an accident, and died when seven months old; she weighed 34 stones.

A steer, by a brother to the above heifer, three years and two months old, weighed 105 stones; and another steer, by the same bull, exactly three years old, weighed 95 stones. Both were kept as store-beasts till two years old.

An ox, bred by Mr. Hill (of Blackwell,) slaughtered at six years old, weighed 151 stones, 10lbs.; tallow, 11 stones.

The Howick red ox, seven years old, weighed 152 stones, 9lb.; tallow, 16 stones, 7lb.

Mr. Charge's ox, seven years old, weighed 168 stones, 10lb.; tallow, 13 stones.

The foregoing instances of weight and proof satisfactorily show, that in the Teeswater cattle, Mr. Charles Collins had pretty good materials with which to commence operations. Let us now refer to a later period, and state some particulars respecting their descendants, the improved shorthorns.

In the year 1808, Mr. Bailey, the agricultural historian of Durham, informs us, he saw, at Mr. Mason's (of Chilton,) a cow, not less remarkable in point of fat than the Durham ox. At that time, the depth of fat, from the rump to the hips, in a perpendicular position, was not less than twelve inches; and the shoulder score, at least nine inches thick.

Mr. Robert Colling's heifer, which, like the Durham ox, was exhibited as a curiosity, was estimated, at four years old, to weigh 130 stones.

The same gentleman sold, in Darlington Market, on the 18th of April, 1808, a two years'-old steer for 22*l.*; the price of fat stock being at that time seven shillings per stone.

At Mr. Nesham's (of Houghton-le-Spring,) Mr. Bailey saw a steer, 25 months old, completely covered with fat over the whole carcass, and supposed to be the fattest steer of his age ever seen. Butchers estimated him to weigh 75 stones. Neither of the last-mentioned were of large size, and would not have weighed above 40 stones had they been no fatter than those usually slaughtered.

Mr. Wetherill (of Field House) sold at the fair in Darlington, in March, 1810, two steers, under three years old, for 47*l.* 10*s.* each. The price of cattle at that fair, 10*s.* per stone.*

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* Mr. Bailey observes, that the common practice among the breeders of the improved short-horns, and which he first observed at Mr. Wetherill's, was to put the year-old heifers to the bull the beginning of July, so as to calve not later than the middle of May. The

Mr. Arrowsmith (of Ferryhill,) who fed off his short-horns at two years old, furnished the following particulars of the prices he obtained from the butchers: viz.

In 1801, sold four for 25*l.* each; two steers, and two heifers.
1802, six for 17*l.* 10*s*, each; three steers, and three heifers.
1803, four for 17*l.* each.
1804, six for 18*l.* 10*s.* each.
1805, six for 17*l.* 10*s.* each; two steers, and four heifers.
1806, four for 16*l.* each.
1807, eight for 18*l.* each.
1808, eight for 19*l.* each.

The time of selling, from the beginning to the latter end of May. Management.—In the first winter they got straw in a fold-yard, with nearly as many turnips as they could consume; in May they went to grass; in November put to turnips through the winter, and turned to grass the first week in May.

A twin heifer, belonging to Mr. Arrowsmith, calved the last week in April, being kept the first year as the store-stock, was entered for a sweepstakes, to be shown in June, at which time she would be two years old. She was immediately turned to grass in the usual pasture. In No-

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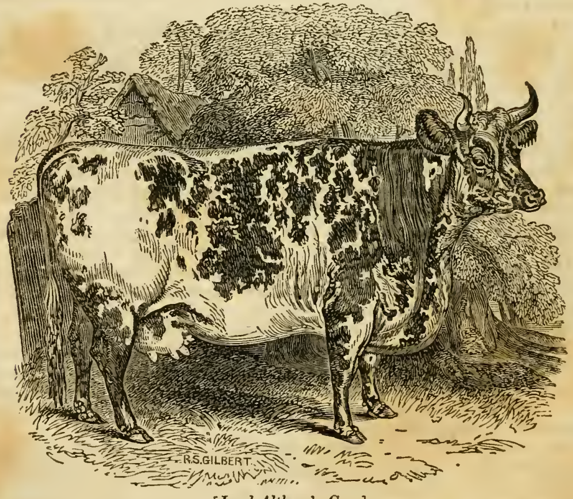
calves ran with and sucked their dams until August. The cows were then put upon foy, fed through the winter with turnips, and sold to the butchers in May or June following, for 25*l.* on an average, which, with the value of the calf, could not be reckoned at less than 30*l.* for a three year-old heifer.

The following are portraits of a cow and heifer belonging to Lord Althorp:—



[*Lord Althorp's Cow.*]

The cow, marked in his lordship's herd-book by the figures 25, is particularly distinguished by the excellence of her crop, plates, and loins.

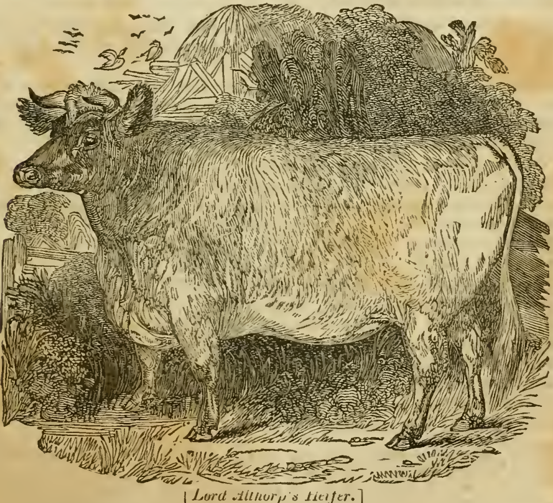
vember she was estimated to weigh 28 stones; when she was put to the ruta baga, and hay, and oil-cake, of which she ate 4cwt., with 2 bush. bean-meal, and 1 bush. barley. She went to grass again on the first of May, and from that period had neither cake nor corn. On the 23d of July, it was the unanimous opinion of the best judges that she weighed 58 or 60 stones; having gained 30 stones in 30 weeks.

In April, 1808, Mr. Bailey saw, at Mr. Arrowsmith's, eight yearlings, intended for the course of feeding described as adopted by that gentleman; whose sales, from 1801 to 1808 inclusive, have been already particularized. They were *very lean*, not more than 15 stones each; and had they been offered for sale in a fair, no person, unacquainted with the breed, would have given more for them than 4*l.* 10*s.* or 5*l.* per head.

Mr. Walton (of Middleton in Teesdale) had been, in 1808, in the habit of selling his steers, at two years and a quarter old, at from 20*l.* to 30*l.* each; their weight being 50 to 54 stones, fed solely on vegetable food. He often, for the sake of experiment, bought in calves of the improved, or old breed of the county, and he uniformly found that his own at two years old got fatter, and fitter for the butcher, than the others did at three, although fed and kept exactly alike.

Mr. Mason (of Chilton,) in the course of an experiment to ascertain the weight of beef gained by the food given (turnips,) found three steers, under three years old, to have gained 20 stones each in 20 weeks. The three steers averaged 70 stones each.

In 1816, Mr. Nesham's steer, three years and a half old, obtained the premium offered by the Durham Agricultural Society; his weight was, 4 quarters, 96 stones, 1½lb.; tallow, 11 stones, 7lb.; hide, 8 stones.



[*Lord Althorp's Heifer.*]

The heifer, called *Clarion*—a daughter of the opposite—is equal to her dam in these points, and far superior in some others; particularly in her rump and hips. She is a very fine specimen of the short-horn heifer.—*Edit.*

Major Rudd (of Marion in Cleveland) obtained the premium offered by the Cleveland Agricultural Society in 1811, for the best steer, under three years old, and fed on vegetable food. The steer was sold to the butcher for 10*s*. per stone, and slaughtered when three years and thirteen days old; the weight of his four quarters was 96 stones.

The late Mr. Robertson (of Ladykirk, near Berwick-upon-Tweed) furnished the writer with the following particulars of short-horns, bred by him, and fed, with few exceptions, on vegetable food:—

1794.—An ox, four years, ten months old; four quarters, 145 stones, 3lb.; tallow, 24 stones, 7lb.

A steer, under four years old; four quarters, 106 stones; tallow 19 stones, 7lb.

1814.—A steer, three years, nine months old; four quarters, 101 stones; tallow, 15 stones.

1815.—A steer, three years, eleven months old; four quarters, 112 stones, 7lb,; tallow, 26 stones.

A heifer, three years, eight months old; four quarters, 89 stones.

1817.—A steer, three years, two months old; four quarters, 95 stones, 10lb.; tallow, 17 stones, 10lb.

1822.—An ox, four years and a half old; four quarters, 135 stones; tallow, 21 stones.

Own brother to the foregoing, three years and a half old; four quarters, 133 stones; tallow, 21 stones.

A steer, three years, ten months old; four quarters, 124 stones; tallow, 17 stones.

A steer, three years, eight months old; four quarters, 112 stones; tallow not weighed.

A steer, bred by Col. Cooke (of Ouston, near Doncaster,) fed on potatoes and straw, was slaughtered when two years and twenty-two days old; his four quarters weighed 72 stones.

Mr. John Rennie (of Phantassie) produced, at the East Lothian Agricultural Society's meeting, in November, 1823, a steer, from eighteen to twenty months old; the four quarters of which weighed 118 stones, 1lb. Smithfield-weight.

The same gentleman produced before the Highland Society of Scotland a steer, aged two years, four months, whose four quarters weighed 153 stones, 7lb.: also a steer, aged three years, six months, whose four quarters weighed 169 stones, 7lb.; tallow, 30 stones, 1lb.

Except in the three last instances, all the weights given have been by the stone of 14lb.*

Should the foregoing statement be considered to have been unreasonably extended, it is presumed it will, at least, be admitted, that its ample detail, if attended to, will establish the credit of the short-horns as an invaluable breed to the grazier.

In the commencement of this account, however, it was stated that they possess a combination of qualities, hitherto considered incompatible. It will be obvious that the disposition to feed rapidly, in union with dairy qualifications, is here intended.

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* That extraordinary animal, which was lately exhibited under the name of the 'Lincolnshire Ox,' although fed in that county by Lord Yarborough, was a pure short, both on the side of the sire and the dam. He measured five feet six inches in height at the shoulders, eleven feet ten inches from the nose to the setting on of the tail, eleven feet one inch in girth, and three feet three inches across the hips, shoulders, and middle of the back. His breast was only fourteen inches from the ground, and he stood one foot ten inches between the fore legs.—*Edit.*

It might have the appearance of an intention to depreciate other breeds of cattle, were an inquiry instituted how the very general inpression came to be entertained that animals disposed to fatten rapidly seldom give much milk. It is unquestionably true, that every perfection in cattle—whether it be one of form, of quality of flesh, of disposition to fatten, or to yield milk—can be promoted and retained solely by the breeder's devoted attention to his particular object; and if one object be allowed a paramount importance in the breeder's estimation and practice, other objects will suffer, in proportion as they are neglected.

The improvement in the carcass of the short-horns has been so surprising, and so justly valued, that many persons have allowed that completely to occupy their attention, and the dairy has been disregarded. In such a state of things, every advance towards one point has been tantamount to receding from another; because the same proceeding which tends to enhance a particular quality, will also enhance a defect, provided such defect was of previous existence.

This may be rendered more intelligible by a short illustration:—Suppose half a dozen animals to be selected in consequence of their possessing a particular quality; which quality it is proposed, on a certain established principle of breeding, to increase and render almost permanent by their union. Suppose the animals so selected to come from the hands of breeders who have neglected the milking property; the certain consequence will be, that the very union which developes and secures the desired object will tend, on the same principle, to increase the defect as to milk. In short, it will render it *habitual* in the produce. But this illustration, by a *selection*, is supposing too much for the probable state of the case. The objections which exist among breeders for various and some cogent reasons, against crossing with the stocks of each other, unavoidably lead to the practice of breeding in and in; which in case of any original deficiency of the milking property, must unquestionably go on to render that deficiency greater. It is hence evident that bad milking, in a breed of animals which were ever distinguished as good milkers, is not a necessary consequence of improvement in the animal in other respects, but a consequence of the *manner* in which such improvement is pursued. This the writer considers to be the reasoning properly applicable to the subject; which happily also admits of a satisfactory appeal to facts; and he is strictly justified in asserting that improved short-horns, inferior to none for the grazier, may always be selected and bred with the most valuable dairy properties. Perhaps a more plentiful and steady milker than the dam of Mr. Berry's bull, whose portrait has been given, never stood over a pail, and few such carcasses of beef have been exhibited as hers, when an accident rendered it requisite to only half feed her. The bull himself has an extraordinary disposition to carry flesh, and his calves are let down in the udders like miniature cows. In fact, all the bull's family are excellent for the pail, and the quickest possible feeders. The writer has known many instances of the highest bred short-horns giving upwards of four gallons (wine measure) of milk night and morning; and it is certain that attention only is requisite, on the part of the breeder, to perpetuate this quality in any desirable extent. While on this subject, it is proper to observe, that the excessive quantities of milk obtained from the unimproved short-horns are seldom or ever obtained from the improved; but a moderately good milker of the latter kind will be found to yield as much *butter* in the week as one of the former; the milk being unquestionably of very superior quality; and, indeed, it was likely such should be the case, and that the artificial change in the animal economy, which leads to an excessive secretion of flesh and fat, should also be productive of other rich secretions. Within the last three or four years, affidavits were sworn before a magistrate in America, that an improved short-horned cow imported thither, produced after the rate of 20lb. of butter per week.

Wherever the improved short-horns have been crossed with other cattle, their superiority is equally manifest, in respect of dairy qualifications, as in every other. On this subject the writer is able to avail himself of the evidence of a gentleman who has addressed a communication on the subject to the Conductor of the *British Farmer's Magazine*, which is so pertinent to the present subject that the temptation to take an extract is irresistible. It is as follows:—'In the 27th number of your valuable Magizine, when giving an account of my two years'-old steer, you also give an extract from my letter on the advantages of crossing cows of different breeds with improved short-horn bulls; and in confirmation of this opinion (not hastily adopted, but the result of several years' practical experience, and a close attention to the experiments of several friends during the last seventeen years,) I send you the portrait and a short account of a two-year old Durham and Devon heifer of mine, lately slaughtered by Mr. William Daniel (of Abergavenny,) and accompany it with a few brief statements of the advantages derived from this system by several of my own personal friends.

'This heifer was the second cross, and was of a light gray colour. She weighed 35 scores and 8lb.; rough fat, 98lb.; she was allowed to be the fattest and best beast of her age, in all points, ever seen in Abergavenny. She had a dead calf about six weeks before Christmas; was dried the 17th of January, and killed the 10th of June. She sold for 19*l*. 3*s*. 6*d*.

	lbs.
'Her live weight, on the 8th of June, was .	1232
Ditto, on the 17th January	840
Increase in 140 days	392

'Being aware that strong prejudice and much incredulity existed on the subject of crossing, I courted the attention of all the respectable farmers, breeders, and feeders in this neighbourhood. Many came to see her when first put up, and repeatedly afterwards during the five months she was feeding; and they all concurred in saying she went on faster than any beast they had ever seen. She never had any oil-cake.

'I have seen many excellent beasts bred from improved short-horn bulls and long horn cows: indeed, I never knew one of these bulls put to any cow, where the produce was not superior to the dam; but the cross which I advocate, and with which I am best acquainted, is that with the Devon cow. I have uniformly remarked, that each succeeding cross was attended with a proportionate improvement in size, quality of flesh, and aptitude to fatten. In every instance they have shown themselves superior milkers, and stand to the pail till within six or eight weeks of calving; and several instances have come under my own knowledge where they have never been dry since they first calved; and so highly are they prized as milkers, that a friend of mine, who hired out dairies, informed me that the dairymen gave him nearly 2*l*. per cow per year more for the half and three-quarter breeds than they would give for cows of other breeds.

'A friend of mine had about a dozen North Devon cows, small in size, but nice in quality, and from these he commenced, about twenty years since, breeding with short-horn bulls. He has since invariably used those bulls. With each succeeding cross the stock have rapidly improved in every essential, and the only trace of the Devons which I could perceive when I last saw them, about two years since, was a peculiar richness in their colour. He breeds about thirty annually, and generally sells his three years-old, in the autumn, at 17*l.* to 22*l.*; and I have known him sell in-calf heifers to jobbers in fairs as high as 30 guineas each. All his stock are superior milkers. Here we have twenty years' experiment, and continued improvement.

'Within the last eight years I have sent many North Devon heifers to Ireland, to friends residing in different counties, and some of them occupying land of very inferior quality. I also sent over two young Durham bulls, from the stock of the Rev. Henry Berry, to cross them with. They have all crossed them with short-horn bulls at my recommendation, and the accounts they give are most satisfactory. They say the two years'old half-breds are as good as the three years'-old Devons, and are all good milkers. One of these bulls, by Mr. Berry's *Mynheer*, has been four times exhibited in three different counties, and has each time taken the first prize. He was last year sold for 60 guineas, and is now serving cows at 1*l.* each.

'*Brynderry, near Abergavenny.* C. H. Bolton.

An opinion generally prevails that the short-horns are unfitted for work; and in some respects it is admitted they are so: but the correct reason has not been assigned, and the question may fairly come briefly under notice. That they are willing and able to work, the writer knows, from one in particular among many instances. He has now a team of two years-old steers, working constantly nine hours a day; a system he would by no means recommend, and forced on him by circumstances connected with entrance on a new farm, at present ill adapted to grazing cattle. They work admirably; but surely cattle which, as the preceding account proves, will go as profitably to the butcher at two years old as any other breed at three, and as many even at four, ought never, as a general rule, to be placed in the yoke. No beast, in the present advanced state of breeding, ought to be put upon a system which arose out of the necessity of obtaining compensation by work for the loss attending a tardy maturity. But where it may be convenient, the short-horns, particularly the bulls, work admirably, as their great docility promises: and there are many operations going on in every farm which a bull would be judiciously employed in performing. And as the bulls of this breed are apt to become useless, from acquiring too much flesh in a state of confinement, moderate work might, in most cases, prove beneficial for such as are intended for use at home.

As was before observed, the specimens which accompany this account will render little comment necessary on their form. With deference, however, it is submitted to the breeders of short-horns that they should avoid breeding from too close affinities, and, while they steer clear of coarseness, should require a sufficiency of *masculine* character in their males.* The portrait of Lord Althorp's bull *Firby* evinces this requisite in a proper degree. He has also—but, indeed, it is only part of the other; for without it good masculine character cannot exist—an excellent loin. This is a point in which many short-horns are rather defective, and it is one of infinite importance. Add to this, that if, in many instances, the length of the carcass were abated, as well as that of the legs, a hardier animal, with equal size and on a more profitable scale, would be produced. The facilities for making this improvement are sufficiently numerous, the short-horns being now more generally diffused. That wider diffusion also multiplies the means of selecting for milk; a quality which should not be lost sight of: for it is the *combination* of perfections which has conferred, and will perpetuate, the superiority of this breed of cattle.

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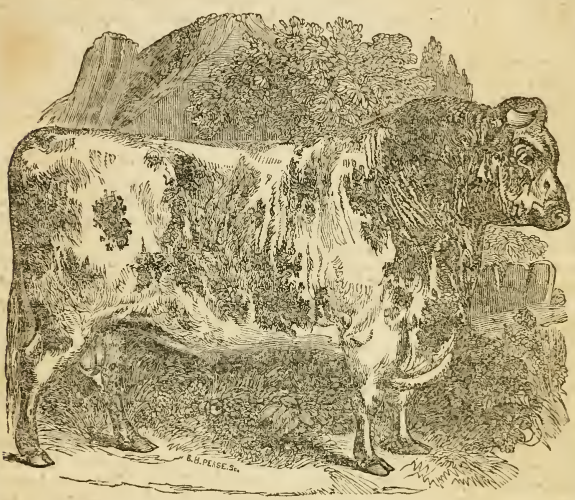
* Lord Althorp first adopted the short-horns in 1818, when he purchased the bull *Regent*, at Mr. R. Colling's sale, with several of that gentleman's cows; and since that time his lordship has been unremitting in his attempts to improve the breed. The bull *Firby* is good in almost every point. His flanks, loins, hips, and bosom are excellent. His only failing is in the crop; yet we are told by his lordship's very intelligent steward (Mr. Hall,) and we had proof of the accuracy of the observation, when we had the pleasure of looking over the Wiseton herd, that, after using him six years, very few of his stock have inherited this imperfection.—*Edit.*



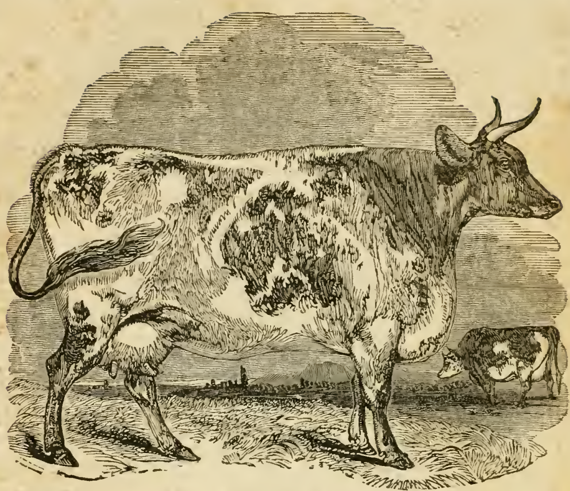
[*Lord Althorp's Bull.*]

The colours of the improved short-horns are red or white, or a mixture of the two, combining in endless variety, and producing, very frequently, most brilliant effect. The white, it is very probable, they obtained from an early cross with the wild breed; and whenever this colour shows itself, it is accompanied, more or less, with a red tinge on the extremity of the ear: a distinctive character, also, of the wild cattle. No *pure improved short-horns* are found of any colours but those above named. There is a large coarse short-horn, prevailing particularly in Lincolnshire, denominated in the quotations of the Smithfield markets 'Lincolns,' and generally sold at prices below those of any other cattle. These are frequently black, black and white, blue, and dun; but they have no further affinity with the improved short-horns than as the latter have been referred to for their improvement, which has been accomplished to a considerable degree. A similar description of large, coarse short-horns, of these objectionable colours—for they generally accompany a bad quality of flesh—prevails in some of the midland counties. They are great consumers of food, gutty, and particularly low and bad in the loins, with excessively heavy shoulder-blades. The owners of this stock, however, are crossing with the improved breed; but the dairy-farmers of Gloucestershire are so much alive to the superiority of the short-horns, that they lay hold with avidity of any thing which approaches them in colour, or is called by the name. Indeed should this breed continue to obtain the requisite attention, to maintain it in its present excellence, it is not too much to suppose that it will, before long, alter the character of the cattle in most of the great breeding districts. It would have been thought incredible some years ago, but is nevertheless the fact, that they are treading closely on the strongholds even of the Herefords; and an observing traveller, who sees their colours starting to view in very unwonted situations, must pronounce them universal intruders.

Thus far Mr. Berry, whose admirable account of the improved short-horn cattle our readers will duly estimate. There is no point which he has more triumphantly illustrated, than the value of this breed, as containing a *combination* of perfections. It was a point which was in a manner lost sight of by the early improvers. They developed the aptitude to fatten, and the early maturity of the short-horns, but they neglected, and were beginning to lose, their milking properties. This is also the grand error of many modern breeders; and hence arose the general impression, and founded on careful observation, that in proportion as the grazing properties of the beast were increased, its value for the dairy was proportionably diminished.

The Yorkshire cow, which now almost exclusively occupies the London dairies, is an unanswerable proof of the possibility of uniting the two qualities to a great degree of perfection, *but not at the same time:*—they succeed to each other, and at the periods when it suits the convenience of the dairy man that they should. Twenty years ago the Yorkshire cow was, compared with other breeds, as great a favourite in the London market as at present. She yielded more milk, in proportion to the quantity of food consumed, than could be obtained from any other breed; but when the dairyman had had her four or five years, she began to fall off, and he dried her and sold her. It took a long time to get much flesh upon her bones; and when he calculated the expense of bringing her into condition he found that his cheapest way was to sell her for what she would fetch, and that seldom exceeded 5*l.*

By degrees, however, some of the more intelligent of the breeders for this market began to find that, by cautiously adopting Mr. Berry's principle of selection—by finding out an improved short-horn bull, whose progeny were generally milkers, and crossing some of the old Yorkshires with him, and then going back to the pure blood—but still regarding the milking properties of the dam, and the usual tendency to possess these qualities in the offspring of the sire—they could at length obtain a breed that had lost little of the grazing properties of the new breed, and retained, almost undiminished, the excellences of the old breed for the pail. Thence it has happened that many of the cows in the London dairies are as fine specimens of the improved short-horns as can possibly be produced. They do not, perhaps, yield *quite* so much milk as the old ones, but what they do yield is of better quality; and whether the dairyman keeps them a twelvemonth or a little longer—and this is getting more and more the habit of these people—or whether he milks them for three or four years—as soon as he dries them, they fatten as rapidly as the most celebrated of the improved breed. Mr. Parkinson gives an account of one, which, after being milked to the 5th of April, was put to grass with others, and sold on the 5th of July after 91 days' grazing, having made in that time nearly 2*s.* a-day.



[*The Yorkshire Cow.*]

This is a fair specimen of one of these cows: the character of the Holderness and the Durham beautifully mingling. A milch cow good for the pail as long as she is wanted, and then quickly got into marketable condition, should have a long and rather small head; a large-headed cow will seldom fatten or yield much milk. The eye should be bright, yet with a peculiar placidness and quietness of expression; the chaps thin, and the horns small. The neck should not be so thin as that which common opinion has given to the milch cow. It may be thin towards the head; but it must soon begin to thicken, and especially when it approaches the shoulder. The dewlap should be small; the breast, if not so wide as in some that have an unusual disposition to fatten, yet very far from being narrow, and it should project before the legs; the chine, to a certain degree fleshy, and even inclining to fulness; the girth behind the shoulder should be deeper than it is usually found in the short-horn; the ribs should spread out wide, so as to give as globular a form as possible, to the carcass, and each should project farther than the preceding one to the very loins, giving, if after all the milch cow must be a little wider below than above, yet as much breadth as can possibly be afforded to the more valuable parts. She should be well formed across the hips and on the rump, and with greater length there than the milker generally possesses, or if a little too short, not heavy. If she stands a little long on the legs, it must not be too long. The thighs somewhat thin, with a slight tendency to crookedness, or being sickle-hammed behind: the tail thick at the upper part, but tapering below; and she should have a mellow hide, and little coarse hair. Common consent has given to her large milk-veins; and although the subcutaneous or milk-vein has nothing to do with the udder, but conveys the blood from the fore part of the chest and sides to the inguinal vein, yet a large milk-vein certainly indicates a strongly developed vascular system—one favourable to secretion generally, and to that of the milk among the rest.

The last essential in a milch cow that we shall mention is the udder, rather inclining to be large in proportion to the size of the animal, but not too large. It must be sufficiently capacious to contain the proper quantity of milk, but not too bulky, lest it should thicken and become loaded with fat. The skin of the udder should be thin, and free from lumps in every part of it. The teats should be of moderate size; at equal distances from each other every way; and of equal size from the udder to nearly the end, where they should run to a kind of point. When they are too large near the udder, they permit the milk to flow down too freely from the bag, and lodge in them; and when they are too broad at the extremity, the orifice is often so large that the cow cannot retain her milk after the bag begins to be full and heavy. The udder should be of nearly equal size before and behind, or, if there is any difference, it should be broader and fuller before than behind.*

The quantity of milk given by some of these cows is very great. It is by no means uncommon for them, in the beginning of the summer, to yield 30 quarts a day; there are rare instances of their having given 36 quarts; but the average measure may be estimated at 22 or 24 quarts. It is said that this milk does not yield a proportionate quantity of butter; and that, although these cows may be valuable where the sale of milk is the prime object, they will not answer for the dairy.

That their milk does not contain the same proportionate quantity of butter as that from the long-horns, the Scotch cattle, or the Devons, is probably true; but we have reason to believe that the difference has been much exaggerated, and is more than compensated by the additional quantity of milk. At the first introduction of the improved breed, the prejudice against them on this account was very great, and certain experiments were made, by the result of which it was made to appear that the milk of the Kyloe cow yielded double the quantity of butter that could be produced from that of the improved short-horn. Two ounces were obtained from the milk of the Kyloe, and one from that of the short-horn.

This aroused the advocates of the new breed, and they instituted their experiments, the result of which was much less to the disadvantage of the short-horns. Mr. Bailly gives an account of an experiment made by Mr. Walton of Middleton.

He took from his dairy 6 cows promiscuously, and obtained the following quantity of butter from a quart of the milk of each of them:—

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* There are some doggerel lines, which so well express the greater number of the good points of such a cow as we have been now describing, that we are tempted to copy them from the Farmer's Magazine:—

'She's long in her face, she's fine in her horn,
She'll quickly get fat without cake or corn;
She's clean in her jaws, and full in her chine,
She's heavy in flank, and wide in her loin.

'She's broad in her ribs, and long in her rump,
A straight and flat back, without ever a hump:
She's wide in her hips, and calm in her eyes,
She's fine in her shoulders, and thin in her thighs.

'She's light in her neck, and small in her tail,
She's wide in her breast, and good at the pail;
She's fine in her bone, and silky of skin—
She's a grazier's without, and a butcher's within.'

	oz.	dwts.
No. 1 . .	3	6
2 . .	1	6
3 . .	1	12
4 . .	1	10
5 . .	1	14
6 . .	1	6
	10	8

which, divided by 6, leaves nearly 1oz. 14$\frac{3}{4}$dwts., or about $\frac{7}{8}$ of the weight of butter from the same quantity of milk. Then, the increased quantity of milk yielded by the short-horn gave her decidedly the preference, so far as the simple produce was concerned.

This experiment brought to light another good quality in the improved short-horn, which, if not altogether unsuspected, was not sufficiently acted upon—that she improved as a dairy-cow as she got older. The cow, a quart of whose milk produced more than 3oz. of butter, was six years old, the other five were only two years old; at all events the experiments proved that her milk was richer at six years old, than it had been at two. This a subject which deserves investigation.

Another circumstance is somewhat connected with such an inquiry. The Kyloe and the long-horn cattle seem to care little about change of situation and pasture; but the short-horn is not so easily reconciled to a change; and her milk is not at first either so abundant or so good as it afterwards becomes.

A prejudice likewise existed, and perhaps does yet in the minds of some dairymen, against the larger improved short-horns. The breed generally are great consumers; and it was also supposed that in proportion to the condition of the cow, she was likely to run to flesh instead of yielding milk, and therefore a rather small cow was selected, and one that did not carry about her many proofs of point.

That there is a great difference in the quantity of food consumed by different breeds of cattle, cannot be doubted; and that the short-horns occupy the highest rank among the consumers of food is evident enough; but we never could be persuaded that the difference of size in the same breed made any material difference in the appetite, or the food consumed. When they stand side by side in the stall or the cow-house, and experience has taught us the proper average quantity of food, the little one eats her share, and the larger one seldom eats more, even when it is put before her. There are occasional differences in the consumption of food by different animals, but these arise far oftener from constitution, or from some unknown cause, than from difference of size. Experience does, however, prove beyond the possibility of doubt, that the larger cattle, the breed and other circumstances being the same, yield the greatest quantity of milk.

Experience has also proved another thing—that the good grazing points of a cow, and even her being in fair store condition, do not necessarily interfere with her milking qualities. They prove that she has the disposition to fatten about her, but which will not be called into injurious exercise until, in the natural process of time, or designedly by us, she is dried. She will yield nearly as much milk as her unthrifty neighbour, and milk of a superior quality, and at four, five, or six years old, might be pitted against any Kyloe, while we have the pledge that it will cost us little to prepare her for the butcher, when we have done with her as a milker. It is on this principle that many of the London dairymen now act, when they change their cows so frequently as they do; but whether this, even allowing the rapidity with which the beasts fatten, is the best and most profitable mode of management, will be the subject of future inquiry.

Some time after Mr. Walton's experiment, the following observations were made by Mr. Calvert, of Sandysike, near Brampton, on the quantity of butter yielded by one of his improved short-horns. The milk was kept and churned separately from that of the other stock, and the following is the account of the number of pounds of butter obtained in each week,—7, 10, 10, 12, 17, 13, 13, 13, 15, 16, 15, 12, 13, 13, 13, 14, 14, 13, 12, 12, 13, 11, 12, 10, 10, 8, 10, 9, 10, 7, 7, 7.

From this it appears that there were churned 373 pounds of butter in the space of 32 weeks. The cow gave 28 quarts of milk per day, about Midsummer, and would average nearly 20 quarts per day for 20 weeks. She gave more milk when she was depastured in the summer than when she was soiled in the house, in consequence of the very hot weather. She was lame during six weeks from 'foul in the feet,' which lessened the quantity of milk during that time; and the experiment was discontinued, because there was not a sufficient supply of turnips, and the milk of the whole of the herd was rapidly diminishing. For the first fortnight after calving, she was allowed a little broken corn; and from that period to the commencement of the turnip-season, she lived entirely on grass, with some cut clover; when it was necessary to shelter her from the inclement heat. The pasture was by no means of a superior quality.

After such a record—and it is far from being a singular one—'there can be no doubt,' to adopt the language of the reporter, 'of the possibility of raising a breed of milking short-horns, which will surpass every variety of cattle in the kingdom.' We may, perhaps, safely add, that we have that breed, and that it only requires a little care in the selection, and in crossing, to perpetuate it.

We will take a very rapid survey of the few counties not already described, and in which the short-horns are the prevailing breed.

CUMBERLAND.

The native breed of Cumberland was a small long-horned beast, yielding a fair quantity of milk, and of good quality; answering well for the dairy, but not so profitable as grazing cattle. With these were intermingled the Kyloes and Galloways, both of them quicker feeders than the old Cumberlands. They were generally bought in about October, and turned all the winter on the pastures out of which the fat cattle had just been sold—a little hay being allowed them, according to circumstances. They were kept about a twelvemonth, and paid very well.

The long-horns were most used for the dairy, and chiefly for the production of butter. They yielded from one to two firkins per annum, according to their goodness and size: the average produce was about 84 lbs. per cow. Some of them would yield eight quarts of milk per day during the season, and three or four pounds of butter per week. The Cumberland butter used to be in considerable request. The cheese was an inferior article, and chiefly made of skimmed milk.

The short-horns were not slow in penetrating into Cumberland, and establishing themselves there. They were first used to cross the native and Scotch breeds, and sometimes with considerable success. Mr. Bates, of Halton Castle, attempted a cross between the Kyloe cow and the short-horn bull. His object was to increase the quantity of milk from the Kyloe, and to preserve its quality; and to gain that which every one used to imagine the short-horn was sadly deficient in, hardiness. He hoped likewise to reduce the great consumption of food by the short-horn, and, at the same time, to retain his early maturity. To a very considerable extent he succeeded. Mr. Maynard, than whom there could not be a better judge of cattle, and from whose stock descended some of the best short-horns of the north, hired a bull from Mr. Bates, to try what effect would be produced on some of his own pure breeding stock. That the short-horns could be materially improved by such an admixture could scracely be expected; but the value of the old breed of the country has been materially increased.

The pure short-horn is now zealously cultivated in Cumberland, and by none more so, or more successfully, than by Mr. Maynard.

YORKSHIRE—NORTH RIDING.

There are few parts of the kingdom in which so perfect a change has taken place in the breed of cattle as in this extensive division of Yorkshire. Mr. Marshall, who is undoubted authority here, says, in his 'Rural Economy of Yorkshire,' that, at the commencement of the eighteenth century, the ancient black cattle were the only breed in this district. They resembled the present breed of the lowlands of Scotland, mostly horned, but some of them *humbled.* To these succeeded the long-horn, or Craven breed, and which, by degrees, spread over the whole of the northern and midland counties. At that time the chief work of the farm was done by cattle; the horse had not yet quite superseded the slower, but perhaps more profitable, ox, and many of the long-horns, until they began to be improved by the breeders in the midland counties, were deficient in several valuable points, while the use of them was exceedingly inconvenient, and sometimes dangerous, in the yoke.

On these accounts, the long-horns in their turn gave way to the Holderness, or short-horn breed, and that, for a century past, has maintained its ground, and will continue to do so.

Mr. Marshall gives a singular account of these cattle, when first introduced. He says, that 'the Holderness breed were thin-quartered, too light behind, and too coarse before; large shoulders, coarse necks, and deep dewlaps. This form being found disadvantageous to the butcher, increasing the quantity of the coarser parts, and reducing the weight of the prime pieces, the breeder endeavoured to enlarge the hind-quarters; and had he stopped when he had got to the happy medium, he would have wrought a good work; but the fashion was set—cloddy bullocks were in estimation. The first variety of this species of cattle, which I can recollect, was a thick, large-boned, coarse, clumsy animal; remarkably large behind, with thick gummy thighs; always fleshy, but never fat, and the flesh being of a bad quality. This, however, was not the worst: the monstrous size of the buttocks of the calf was frequently fatal to the cow, and numbers of cows were annually lost in calving. These monsters were stigmatized by the epithet 'Dutch-buttocked,' and they were probably the worst breed the Vale ever knew.'

This evil, however, soon cured itself; and, by judicious crossings from their own stock, and, soon afterwards, from the stock of the enterprising and skilful breeders on the banks of the Tees, the Yorkshire cow was brought to her present state of perfection, retaining, with little diminution, the milking properties of the Holderness, and the grazing ones of the improved short-horn, and being, in point of fact, what we have described her to be in p. 244. The old and comparatively improved breed is still indeed found in the possession of most of the dairy farmers of this part of the country, for the prejudice—and, as we have confessed, not an unfounded one—against the improved short-horns, that their milking properties have been sacrificed to the accumulation of fat, still widely prevails. Experience, however, gradually established the fact, that it is prudent to sacrifice a *small* portion of the milk to assist in feeding, when too old to continue in the dairy; or when, as in the neighbourhood of large towns, her services as a dairy-cow are dispensed with at an early age. This cross being judiciously managed, the diminution of milk is so small, and the tendency to fatten so great, that the opinion of Mr. Sale (as quoted by Mr. Sheldon Cradock, of Hartforth, and to whom we return our thanks for some valuable information) is perfectly correct—'I have always found, in my stock, that the best milkers, when dried for feeding, make the most fat in the least time.' This is a doctrine which will be better understood and universally acknowledged by and by. Too many of the improvers of the short-horns have done but half justice to their excellent stock. He would deserve well of his country who, with skill and means sufficient, would devote himself to the illustration of this point.

It has been observed, that the cattle of this district have not improved of late so rapidly as in former times. There may be two reasons for this, viz., that the system of breeding *in and in* has been pursued somewhat too far, and that the depreciation of the times has withdrawn many landed proprietors from agricultural pursuits, and thus lessened that competition which was the most powerful stimulus to exertion.

The average weight of cattle in this riding of Yorkshire varies with the food and age of the animal. A steer, from 2½ to 3 years old, when fit for the market, will usually weigh from 65 to 75 stones, imperial weight, and a heifer from 55 to 65 stones. The usual method of preparing them for the market is simple enough. The calf gets milk for the first two or three weeks, and after that, scalded skimmed milk, mixed with oil-cake boiled in water, with hay and turnips, until the spring pastures have sufficient produce to support him; he remains in them until the following winter, when he is either tied up or turned loose into folds, and fed with straw and turnips until the ensuing May: he is then turned once more into the pasture until winter, when he is brought into the fold-yard as before, until nearly May-day, and now, approaching to a state nearly fat enough for the butcher, three or four months' grass-feeding generally completes him. Both the improved and the unimproved cattle are treated in the same way. Now, however, appears the essential difference between the breeds—the most forward of the unimproved are scarcely ready when the improved cattle are gone, and they are never so fat and pointy as the others.

Upon the clay-soil of Cleveland, and other parts of this district, the grass-land is principally appropriated to the purposes of the dairy. There the unimproved breed mostly prevails; but even there, the most intelligent of the farmers begin to see the propriety of a cross or two from the Teeswater blood. The young cattle are principally sold in the neighbouring markets, and are forwarded to the possessors of extensive turnip-farms in Leicestershire and Northamptonshire.

A great proportion of the cows for the supply of the metropolitan dairies come from the North Riding of Yorkshire. They are sent away within a month or six weeks after calving, and either journey directly to London, or halt for a year or two in Bedfordshire, or some of the midland counties, in order that they may not reach their ultimate destination until they are five or six years old.

Among the breeders of the pure short-horns in this Riding, Major Bower of Welham, deserves honourable mention. His name appears among the purchasers at Mr. Charles Colling's sale. His cow Daisy, bought there, produced some excellent stock. A heifer of his breed, slaughtered at the age of 18 months, weighed 64 stones, imperial weight, and 10 stones of tallow.

The Earl of Carlisle formerly endeavoured to improve the breed of this district by crossing with the Devonshire, and Mr. Cleaver, with the Sussex cattle, and it was said that more kindly feeders were obtained, the size was reduced a little, the leg shortened, the bone rendered finer, the form improved, and the strength of the short-horn remained for draught with the activity of the Devon. Whatever might have been the case with the first cross, this supposed improved race has passed quite away.

A cross between the short-horn bull and the Argyleshire heifer was attempted, with greater prospect of success. Mr. Bates had obtained some excellent cattle from a similar attempt, but they could not be fed to an equal weight in the same time, and they were deficient in early maturity.

WEST RIDING.

This is principally a manufacturing district, and there are comparatively few agriculturists who pay much attention to the improvement of the breed of cattle. The short-horns, either the Holderness or with some crosses of the Durham, are chiefly found in the neighbourhood of large towns. More in the country, and where the farms are small, (as they are through a great part of this riding,) there are a variety of crosses with the long-horns, and with nondescripts of former days. They go under the characteristic name of *half-horns;* the country people are fond of them, they are hardy, yield plenty of milk, and fatten with tolerable quickness. One would wonder how they retain one good quality, for Mr. Sorby, of Holyland-hall, very characteristically describes them, and the little farmers of almost every district—'Those who have a cow or two, of some favourite kind, send them to the nearest bull, which does well enough, provided he gets them a calf.' We must confess, that we nowhere saw so great a collection of Mongrels as in the manufacturing portion of the West Riding.

Mr. Newman, the agent of Lord Fitzwilliam, satisfactorily accounts for this. He thus writes to us—'the breed of cattle in the greatest esteem in the vicinity of Wentworth, and in fact throughout all the southern part of the West Riding of Yorkshire, is the pure short-horn. A traveller, however, passing through this district, will observe many deviations from that breed, and will meet with crosses that he will have much difficulty to identify. The farms are small, and the farmer has a kind of mixed employment, partly agricultural and partly mercantile; hence his attention is not so much directed to his farm as it should be, and hence arises a certain degree of carelessness as to the selection of his cattle; added to this, there is an idea, although an erroneous one, that the pure short-horns are not good milkers, and which tends materially to check the breed.'

In the districts near Doncaster, where the population is more strictly agricultural, the short-horns prevail, and those of a breed and quality highly creditable both to the mere tenant-farmer and to the gentleman who farms his own estate.

It is due to the memory of the late Mr. Mitton, of Badsworth, to place him at the very head of the improvers of short-horn cattle in this district. His 'Old Bull,' known in the Herd Book by the name of 'Badsworth,' is still in the recollection of the farmers, of that neighbourhood, and no animal contributed more to the improvement of the cattle for many miles round.

About the year 1805, the Wortley Farmers' Club was established, chiefly by Lord Wharncliffe (then Mr. Stuart Wortley,) and by the operations of that society very considerable improvement was effected in the breed of cattle, sheep, and pigs, round Wortley. In 1818 this society ceased to exist, for one more effective had been formed at Doncaster, under the patronage of Earl Fitzwilliam, Lord Althorp, Sir A. Cook, and Mr. Fullerton of Thrybergh Park, and other neighbouring gentlemen. This society still flourishes, and a very fair number of excellent cattle are annually exhibited, the males of which become dispersed through a wide district of country. The short-horn cattle have borne away all the prizes.

In almost every part of the West Riding, many Scotch are fed for one year or two, and then sold to the butcher to be slaughtered for home consumption.

As we advance towards the moorlands of the west and north-west of the district, the half-horns prevail more; and in Craven, the native county of the long-horns, we find both the large and the small variety of this breed in tolerable perfection, but perhaps not so much so as in the north of Lancashire. Even here, the short-horns have penetrated and are increasing.

EAST RIDING.

The short-horns prevail universally through this riding, except among the cottagers and little farmers, who still obstinately cling to some of the different varieties of half-horns. It is decidedly a breeding country, and a great number of cows are yearly sent from it to Lincolnshire, to be prepared for the London dairies; yet many oxen and cows are brought from the Wolds to the fortnightly and weekly markets so frequent in Yorkshire, and pastured on the rich ground with which the riding abounds.*

LINCOLNSHIRE.

Mr. Berry has disposed of the Lincolnshire cattle in a very summary way, and we apprehend that no appeal can be made against his decision. 'There is a large coarse short-horn prevailing, particularly in Lincolnshire, denominated in the quotations of the Smithfield markets "Lincolns," but they have no further affinity with the improved short-horns than as the latter have been referred to for their improvement, which has been accomplished to a considerable degree.' As, however, we have to travel through each of the counties of Great Britain, we must enter a little more into the consideration of the character and claims of the Lincoln cattle.

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* In some part of this riding, as well as in the north of Lincolnshire, a very useful society or club used to exist, and is still to be occasionally met with, called 'The Cow Club,' the principal rules of which we abridge from 'Strickland's Survey.'

'Each member shall, on the 12th of May, and the 12th of November, pay three-pence in the pound, on her value, for every cow that he insures, which sum when it amounts to 20*l.* shall be placed at interest, in order to accumulate for the benefit of the club. No cow shall be admitted without the approbation and valuation of one of the proper officers of the district, to whom, if required, she shall be sent for inspection.

'Upon the death of any cow, the officer shall inquire into the manner of it; and if it appears to have been caused by wilful neglect, or by his refusing to employ some farrier or veterinary surgeon, he shall receive no benefit; but for every cow dying of disease, and without the neglect of the owner, there shall be paid five-sixths of her estimated value; but no member shall receive any benefit from the institution upon the death of a cow more than fourteen years old.

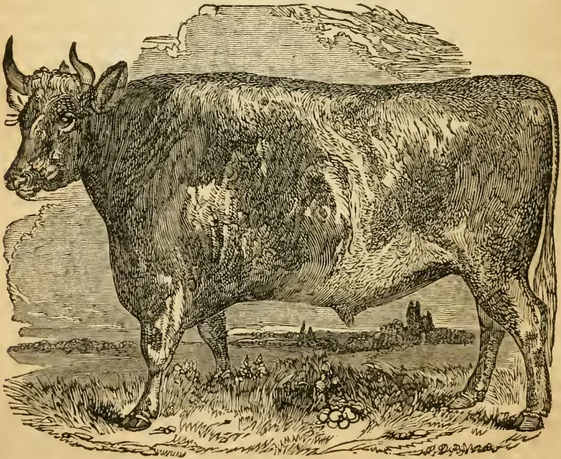
'If, upon any accident, the officer of the district shall deem it necessary to have a cow slaughtered, the owner shall have the option of receiving the net value of her carcass, the expense of slaughtering being deducted, or five-sixths of her estimated value in the books. Every member not making payment on the day appointed, or within fourteen days afterwards, shall be excluded.'

The five-sixths of the value will give the cottager an interest in her recovery or preservation, whereas if he was paid the whole value he might be careless.

Many of the present unimproved Lincolns may be regarded as fair specimens of the best of the old Dutch cattle. So prevalent is the opinion that this was the origin of the breed, that the metropolitan butcher denominates them Dutch cattle, and knows them much better by that name than as Lincolns. There is a coarseness about the head and horn which we have not seen either in the common Holderness or the improved Durham; the bone is comparatively large, the leg high, and the hips and loins wide, approaching to raggedness. Mr. Lawrence has a very appropriate remark respecting them, that they demand that Bakewellian improvement which their sheep have received.

There have been some zealous, and to a considerable degree, successful improvers of this breed. At the head of them stands Captain Turnill, of Reesby on the Wolds. With what materials he went to work is not certainly known, but it is supposed that he confined himself to a selection from the native breed; and certainly he produced a valuable animal, thinner in the horn, cleaner in the bone, lighter in the dewlap, shorter in the leg, full in the bosom, and round in the carcass. The breed was properly called ‘the Turnills,’ and they yet remain in the hands of many farmers. They are handsome-looking beasts, always full of lean flesh; with far greater disposition than before to put some fat on that flesh, and become sooner ripe for the market.

Others, with somewhat more judgment, called in the aid of the Durhams and more speedily and effectually completed their object. They took away the disposition to make lean beef only, although in very great quantities; and if they could not perfectly give to the Lincolns their own early maturity, they materially quickened the process of fattening. An improved Lincolnshire beast is therefore now a very valuable animal; and if a finer grain could be given to the meat, the greater quantity of muscle, compared with that of fat, would be no disadvantage.



[*Lincolnshire Ox.*]

This cut is a fair specimen of the modern Lincoln, with a cross of the Durham, and ready for the market. It was sketched by Mr. Harvey, as it stood in Smithfield.

We are indebted for the following account of the management of the Lincolnshire cattle to Mr. Shield of Fordston, and who, as a genuine Lincolnshire man, is much attached to the Turnill breed.

'After leaving the hand, or the cow, the young cattle are kept during the first winter on hay, hay and turnips, or sometimes hay and a little oil-cake. In the next summer they run on seeds or second-rate land, and too often get nothing but straw in the winter. At two years old they go on worse keeping, and are again wintered at straw. At three years old they fare no better, except that some now give from two to four pounds of oil cake daily; and they are sold, in the spring or summer, by those who have not the means to feed them, to jobbers, who dispose of them to the grazier. He winters them better if he buys them at the latter end of summer, and feeds them off before another winter; but if they are bought in the spring they are generally fed off before winter, many of them being put up for stall-feeding, to which no breed is better adapted.

The Lincolnshire cattle are principally red and white, but a dun variety was introduced about the middle of the last century, by Sir Charles Buck, of Hanby Grange, and which have so much improved in size as almost to overtake the common breed of the county. They are found principally in the neighbourhood of Folkingham, and have been fed up to 116 stones at seven years old.

The extraordinary animal which was exhibited under the name of 'the Lincolnshire ox,' although bred in that county, was an improved short-horn; and many of these are establishing themselves in every part of Lincolnshire.

Here, as in most other districts, there are great varieties of breeds, and which are said to be increasing, and even interfering with the purity of the native one, by means of the great annual importations of Irish cattle.

Some have purposely, and very recently, endeavoured to establish a cross between the best of the long-horned Irish and the short-horns of the county; but the attempt, although promising some success at first, has decidedly failed.

Among the small farmers, half-horns of every size and variety are found, and they are crossed in every way that caprice or folly can suggest, yet they are most of them good milkers. The Lincoln, although better adapted for grazing than for the dairy, yield more milk, and of a richer quality, than some of the advocates for the old order of things are willing to allow.

A great number of the Yorkshire cows, destined for the metropolitan dairies halt in Lincolnshire, and many cattle from the north, as well as numerous herds of Irish beasts, are prepared for Smithfield market.

ESSEX.

There is no distinguishing breed in this county; but the chief agricultural business, so far as cattle are concerned, consists in the suckling of calves and grazing in the marshes, with some attention to the dairy in particular districts.

Our friend, Mr. May, veterinary surgeon, at Maldon, informs us, that the suckling farmers procure their calves at the principal markets, viz.: Romford, Chelmsford, Maldon, Braintree, and Colchester. The Romford market is chiefly supplied from London; Chelmsford and Maldon, from London and Suffolk; and Colchester and Braintree, chiefly from the Suffolk dairies.

They are bought in at from a week to a fortnight old, and are generally fed about twelve or fourteen weeks, when they are either bought by the butchers in the neighbourhood, who kill and dress them, and send them to the London market, or they are sent alive to the Romford and Smithfield markets, where they are purchased by the London butchers.

Many of these calves used to be reared in the rich pastures of Essex, and particularly the heifer calves from the metropolitan dairies; and many a cow went from Essex to keep up those establishments; but this practice is now almost totally discontinued.

The marshes afford excellent grazing for cattle that are not affected by the brackishness of the water, and there are few who suffer materially by this. When cattle are not perfectly ready for the market, a few weeks' grazing on the marshes will bring them rapidly forward. Some are purchased in store condition, in order that they may run three or four months on this luxuriant pasture, and at the expiration of the time they are ready for Smithfield. At some periods of the year these flats are covered with cattle, chiefly of a small kind, and mostly the Welsh or Scotch runts; indeed the grazing is principally confined to these small cattle. A few farmers, however, in every part of Essex, apply themselves to the regular grazing of cattle of a larger size. A few have the Devons, among whom must be reckoned Lord Western, who is partial to these cattle, both to feed and for the dairy. When they are grass-fed, there are always some Scotch or Welsh runts as *trimmers*, i. e., to eat down what the larger and more valuable cattle leave. Many Herefords are prepared for the London market in the same manner.*

The dairy business is confined to a comparatively small part of the county. A considerable quantity of butter is made in the neighbourhood of Epping, and sent to the metropolis in small rolls; and it is deservedly celebrated for the peculiar sweetness of its taste. This depends not on the kind of cow, for occasionally a dairy contains half a dozen different breeds of cows, although the short-horns are the most prevalent, but because they feed during the summer in the shrubby pastures of Epping Forest; and the leaves of the trees, and of numerous wild and aromatic plants which there abound, impart to it its peculiarly sweet flavour. The consumer, however, can seldom be certain that he has the real Epping butter, for a very fair imitation of it is sent up from Northamptonshire; and the London retail dealers, wash the salt well out of the Cambridge butter, and, forming it into rolls, sell it for Epping butter; while a few are more impudent, and sell almost any kind of butter as true Epping.

Attached to the dairy is another business, to which we shall have occasion more particularly to allude in another volume of our work, namely, the fattening of pigs, and the preparation of sausages. The skim milk is devoted to this purpose. Although the milk is always sour before it reaches the troughs of the pigs, they thrive well, and their fat is firmer than that which is procured from others that are fed with pease or meal. This will not, however, appear surprising, when it is known that all the caseous principle of the milk, or that which would produce cheese, is retained in it.

MIDDLESEX.

There is no distinct breed in this county, and a very small portion of the land is applied to the fattening of cattle for the butcher, for the produce from it procured in other ways can be sold at a much higher sum, and would render the system of grazing a losing business. Some land, however, is necessarily devoted to the temporary keep of cattle, as they journey to and from Smithfield, or while they remain unsold from one market-day to another; and a great many cattle are prepared for the market in this county, and more than would be readily supposed before the circumstances of the case are explained.

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* These cattle, both large and small, are usually made fresh upon the marshes, and then tied up to hay, turnips, mangel-wurzel, and oil-cake.

In the first place, at least 12,000 cows are kept in the different dairies in the metropolis and its immediate neighbourhood. These are all short-horns; and since the rapidity with which they can be fattened has been established, few dairymen breed from their cows, but they are fattened and sold as soon as their milk is dried. This will bring 5,000 or 6,000 cows annually into the market.

There is an enormous consumption of fermented liquor and ardent spirit in London, besides what is sold from the breweries, and sometimes from the distilleries, to the regular dairymen. This is chiefly distilled from grain, and the refuse is employed in the fattening of at least 6,000 or 7,000 more head of cattle.

Booth's establishment for the fattening of cattle will afford a fair sample of the rest. It is attached to their distillery at Brentford. The account of the building is chiefly taken from the Farmer's Magazine, an excellent agricultural publication, edited by Mr. Berry. 'The building is 210 feet long, and 180 wide. The side walls are about 10 feet high, with 20 windows on each side, and 8 windows at each end, unglazed, but opened or shut at pleasure. It is lighted by glazed sky-lights in the roof. The roof forms one ridge, and the centre part of it affords space for an ample hay-loft. It is supported by numerous cast-iron and wooden pillars, which, at the first entrance of the observer, have the appearance of a forest of columns. A passage of 6 feet in width extends round the whole building, and between every two rows of cattle are passages of the same width. The whole is lighted at night by 36 gas-lights.

'The cattle stand in double stalls, 7½ feet wide, and the space from the manger to the gutter behind the cattle is about 10 feet: the gutters have an inclination to one end, where are drains to carry off the contents of the gutters.

'There is a common manger, which extends the whole length of each row of cattle, the bottom of which is on a perfect level; but opposite to each beast is a second manger, placed in the first, and elevated three or four inches from the bottom of it, and being about a yard in length; and into which are put the grains and other solid food, the common manger being for the reception of the wash, or any other liquid food.

'The wash is kept in a cistern or tank, above the level of these mangers, and in a different part of the premises; but pipes from this tank are conducted beneath the floor of the building, and communicate with these mangers by means of a distinct cock for each, so that, by turning, the cattle, in any one of the ranges, are instantly supplied with wash. This liquid serves them, in a manner, for food and drink, as it contains the finer particles of the ground malt, and the greater part of the barley meal used in the mashing process.

'The grains are kept in pits, about 12 feet square, and 10 or 12 feet deep, somewhat narrower at the bottom than the top, and lined with brick set in cement. They are trodden in, and raised like the roof of a house, and covered with road-stuff, to exclude the air, and protect them from the weather. Little or no litter is used, and no green food or uncut hay is ever given. Oil-cake is seldom used, it being found that rough clover chaff, mixed with the grains and wash, will fatten to any extent.

The metropolis is the grand mart to which a considerable proportion of the fat cattle from every part of the kingdom is sent. In the year 1830, there were sold in Smithfield, 159,907 cattle, 1,287,071 sheep, 254,672 pigs, and 22,500 calves, for the supply of the metropolis, and the villages and towns within a circuit of eight or ten miles, and occasional contracts for the navy. Besides this there is a great quantity of dead meat sent up from the country, generally speaking perfectly wholesome, and fairly and honestly slaughtered, although it is said that the flesh of some animals that did not come by their death through the hands of man, has occasionally found its way to Newgate market. There are inspectors appointed, who very impartially look after this. This is called the dead market, and may be fairly set against the consumption of the places in the neighbourhood of London, and also the irregular demands for the navy, so that the numbers just stated may be considered as fairly representing the consumption of animal food in the metropolis, exclusive of fish, poultry, and salted provisions.

We subjoin in a note the number of cattle and sheep sold in Smithfield, in every year from 1732 to 1830. It is taken from that most elaborate and valuable work, M'Culloch's Dictionary of Commerce.*

It will be seen that the numbers of cattle slaughtered have been more than doubled during the century; but the inhabitants of the metropolis have been more than trebled since that time. Is less animal food consumed now by each individual than at that time? Not so: but there is an important fact connected with the agricultural interests of the kingdom, that while the numbers of the cattle slaughtered have increased, in order

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* The numbers of Cattle and Sheep sold in Smithfield in each year from 1732 to 1830:—

	Cattle.	Sheep.		Cattle.	Sheep.		Cattle.	Sheep.
1732	76,210	514,700	1765	81,630	537,000	1798	107,470	753,010
1733	80,169	555,050	1766	75,534	574,790	1799	122,986	834,400
1734	78,810	566,910	1767	77,324	626,170	1800	125,073	842,210
1735	83,894	590,970	1768	79,360	642,910	1801	134,546	760,560
1736	87,606	587,420	1769	82,131	642,910	1802	126,389	743,470
1737	89,862	607,330	1770	86,890	649,090	1803	117,551	787,430
1738	87,010	589,470	1771	93,537	631,860	1804	113,019	903,940
1739	86,787	568,980	1772	89,503	609,540	1805	125,043	912,410
1740	84,810	501,020	1773	90,133	609,740	1806	120,250	858,570
1741	77,714	536,180	1774	90,419	585,290	1807	134,326	924,030
1742	79,601	503,260	1775	93,581	623,950	1808	144,042	1015,280
1743	76,475	468,120	1776	98,372	671,700	1809	137,600	989,250
1744	76,648	490,620	1777	93,714	714,870	1810	132,155	962,750
1745	74,188	563,990	1778	97,360	658,540	1811	125,012	966,400
1746	71,582	620,790	1779	97,352	676,540	1812	133,859	953,938
1747	71,150	621,780	1780	102,383	705,850	1813	137,770	891,240
1748	67,681	610,060	1781	102,543	743,330	1814	135,071	870,880
1749	72,706	624,220	1782	101,176	728,970	1815	124,948	962,840
1750	70,765	656,340	1783	101,840	701,610	1816	120,439	968,560
1751	69,589	631,890	1784	98,143	616,110	1817	129,888	1044,710
1752	73,708	642,100	1785	99,074	641,470	1818	138,047	963,250
1753	75,252	648,440	1786	92,270	665,910	1819	135,226	949,900
1754	70,437	631,350	1787	94,946	668,570	1820	132,933	947,990
1755	74,290	647,100	1788	92,829	679,100	1821	129,125	1107,230
1756	77,257	624,710	1789	93,269	693,700	1822	142,043	1340,160
1757	82,612	574,960	1790	103,708	749,660	1823	149,552	1264,920
1758	84,252	550,930	1791	101,164	740,360	1824	163,615	1239,720
1759	86,439	582,260	1792	107,348	760,859	1825	156,985	1130,310
1760	88,594	622,200	1793	116,848	728,480	1826	143,460	1270,530
1761	82,514	666,010	1794	109,448	719,420	1827	138,363	1335,100
1762	102,831	772,160	1795	131,092	745,640	1828	148,698	1288,460
1763	80,851	653,110	1796	117,152	758,840	1829	158,313	1240,300
1764	75,168	556,360	1797	108,377	693,510	1830	159,907	1287,070

to supply the greater demand, their size and value have also increased at a rate that has not been sufficiently appreciated.

According to the estimate of Dr. Davenant, made in 1710, the average weight of the carcasses of black cattle, (so called because most of them were then black,) was only 370 lbs., that of a calf 50 lbs., and those of sheep and lambs, taken promiscuously, 28 lbs.

Calculating upon this, the Select Committee of the House of Commons on Waste Lands, in their first report, printed in 1795, stated that cattle and sheep had, on an average, increased in size and weight about a fourth since 1732.

Middleton, in his very incorrect Survey of Middlesex, calculates that the average gross weight of bullocks fit for slaughter may be taken at 800 lbs., calves 140 lbs., and sheep and lambs 78 lbs., including offal; and that being deducted, according to a rule, to which we shall give due consideration in another place, there will be left 550 lbs. as the dead-weight of the bullock, 50 lbs. as that of sheep and lambs, and 105 lbs. the dead or net weight of calves, making a difference, as Mr. M‘Culloch properly remarks, of nearer one-half than one-fourth.

The improvement of cattle has progressed with unsuspected rapidity since the middle of the last century: in many important points it could hardly be said to have commenced at that time. After consultation with several of the most intelligent butchers of the metropolis, we are induced to take 656 lbs. as the present average dead-weight of bullocks, (some butchers stated 85 stones Smithfield weight, none less than 80—we have taken 82 stones.) The average weight of the calf is 144 lbs., of the pig 96 lbs., and of the sheep and lamb 90 lbs., approaching to double the weight of these animals in 1730. This renders the number of cattle slaughtered in the metropolis and the increasing number of the inhabitants a little more proportionate.

We may now form some not very inaccurate idea of the amount of this branch of the provision trade in London:—

		Average weight.	No. of lbs. consumed
Cattle,	159,907	656 lbs.	104,898,992
Sheep, &c.	1,287,070	90 "	115,836,300
Pigs,	254,672	96 "	24,448,512
Calves,	22,500	144 "	3,240,000
		Number of pounds of meat consumed,	248,423,804

This, estimated at the average price of 6*d*., would be 6,210,595*l*. 2*s*. 0*d*. At 8*d*. it would produce 8,268,293*l*. 9*s*. 4*d*., exclusive of bacon, hams, and all salted provisions brought from a distance, (the importation of Irish bacon and hams into Great Britain is 500,000 cwt.) and also fish and poultry.

This calculation will enable us to determine another curious question—what is the average quantity of meat consumed by each individual in the course of a year? If we divide the gross number of pounds, 248,423,804 by 1,450,000, the estimated number of inhabitants in London and its environs, the quotient will be 170, or each individual consumes nearly half a pound of meat every day. This is a very high calculation compared with that of Paris, where each person is supposed to consume but 80 pounds in the year; and Brussels, where 89 pounds form the allotment of each; but ours is a meat-eating population, and composed chiefly of Protestants; and when we remember that this includes the bones as well as the meat, half a pound a day is not too much to allow to each person.

Cattle are sent from every part of the kingdom to Smithfield market, but many more from some districts than from others. A little before Christmas, the fat beasts, to supply the good people of the metropolis with beef of unusual quality for the holydays, begin to come in. They are sent from every part—from Norfolk and Lincoln, Leicestershire and Northampton, Sussex, the Western and Midland counties, and from the stall-yards more in the neighbourhood of the metropolis. Christmas having passed, the Norfolk cattle, comprising all sorts, but a great many of them home breds and Galloways, throng to the market; and their numbers, compared with those of other districts, increase as the spring advances.

We have lying before us a calculation of the respective numbers from the different districts, at different seasons of the year. In February, March, and April, there arrived 16,000 Norfolks, nearly all stall-fed cattle; while from the North, including chiefly Leicester and Northampton, there came but 600. In May, June, and July, the Norfolk cattle had increased to 17,800, and those from the north had risen from 600 to 3675. In July, August, and September, the grass-fed cattle begin to pour in. The earliest are from the marshes of Essex, and therefore the beasts from the centre and midland districts rise to 5350, while those from Norfolk strangely decrease to 580. Some Leicesters, however, soon become ripe, and quickly follow; long droves from Northamptonshire and Lincoln are not far behind; and the northern cattle, in the preceding quarter 3675, rise to 16,340. In October, November, and the early part of December, the grass-fed beasts still continue to occupy the market, and no less than 33,000 arrived from Leicester, Northamptonshire, &c.; while the supplies from the marshes and the midland counties still partially kept up, and are calculated at 6400, and the Norfolks at 2380. The grass season is now past, and dependence begins to be placed on stall-feeding; and, therefore, as we observed at the outset, the northern cattle suddenly fall to 600, and the Norfolks rise to 16,000.

The farmer has, personally, little to do with the sale of his cattle, but custom and interest induce him to consign them to a salesman, who seldom buys or sells on his own account. There is a law which prohibits him from buying altogether, but we fear that law is sometimes evaded. He is acquainted with all the butchers and dealers of the district, and with the contractors: he sees at a glance what is the state of the market; he can tell whether it is likely to rise or fall; and, comparing the lot which is entrusted to him with others, and with the market generally, he knows exactly what they ought to fetch. The salesmen are generally honourable men; they procure for the owner the value of his cattle under all the circumstances of the market, and although it may not always be so much as the grazier had expected, it is more than he could have got himself, and he is always sure of receiving his money.

When Smithfield was first appointed as the site of the periodical market for cattle, no better situation could possibly have been selected. It was without the walls of the city; it was a large uninclosed space, and would have held ten times the cattle that were sent there. There was plenty of room for them without their being cruelly packed together, and there was no inconvenience nor danger from driving them through the streets. In process of time, however, the field was encroached upon, and partly built over; and barely room was left for the accommodation of half the present number of cattle, and those of only half the size of the improved breeds. A dense population began to surround the field on every side, and it was necessary for the cattle to pass through the most crowded thoroughfares. Thence arose danger to human life, and many an act of cruelty to the poor beast; and not only so, but the most barbarous expedients were resorted to to pack the cattle in the circumscribed space which was now left to them, —barbarities which it would not be thought could be practised in a Christian country, if they were not authenticated beyond all doubt. We subjoin one statement of them in a note: it deserves the attentive perusal of every one connected with cattle, and, we trust, will lessen the virulence with which some, more from an erroneous calculation of interest, than from an actual want of human feeling, oppose the removal of the cattle-market once more to the outskirts of the city, and the establishment of abattoirs or slaughter-houses there. The extract is taken from 'The Voice of Humanity,' an excellent and cheap quarterly publication, that ought to be in the hands of every one who is averse to unnecessary cruelty.*

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* 'In Smithfield market there is not room to tie up to the rails much more than half of the cattle sent there for sale! The remainder are disposed of by being formed, in groups of about twenty in each, into "rings" or "off-droves," as such divisions are termed. About two o'clock in the morning the Smithfield barbarities are at the height, and the constables, being sent into the market in the daytime only, are consequently not in attendance. The drovers surround the unfortunate bullocks which cannot be tied up in the market, and commence by aiming with their bludgeons blows at their heads, to avoid which they endeavour to hide their heads, by keeping them towards the ground. On attempting to run backwards, the bullocks are restrained by blows upon their hocks and legs, together with the application of goads; whilst, if they venture to lift up the head, a dozen bludgeons are instantly hammering on it, until again lowered to the ground. This scene of barbarity is continued until every bullock, however refractory, obstinate, stupid, or dangerous at first, has been disciplined to stand quietly in a ring—their heads in the centre, their bodies diverging outward like the radii of a circle: this is done that they may conveniently be handled by the butchers. The barbarity of Smithfield is at its height during the night; but in the daytime, by seeing the process by which one or more bullocks, when sold, are driven out of a "ring" or "off-drove,"—and observing the hammering with bludgeons on the head; the thrusting the goads into the nostrils of the animals to make them move backwards, after similar instruments had been applied to urge them in the contrary direction; by witnessing the mode of re-forming the "rings" or "off-droves," which are constantly broken through by the withdrawment of purchased animals, as well as by the passing and repassing of carts and drays, some faint idea may be formed of the amount of needless barbarity inflicted, and of the consequent deterioration of the meat. The deterioration of the meat has been calculated at no less a sum than 100,000*l.* per annum, notwithstanding the care which the drovers take to strike chiefly where there is no flesh interposed between the skin and the bone; where the animal feels most acutely, but there is no black mark to tell tales.—"I have lived fourteen years in Smithfield," said a very intelligent witness, "and I find it perfectly impossible to sleep in the front of my house on the Sunday night. The cruelty practised upon the cattle, in beating them into the 'rings,' no person can believe who has not seen it; and, as it is a matter very easily to be seen, I hope some of the committee (now sitting) will see it personally. Supposing a salesman to have twenty beasts (which could not be tied up,) he will have them all with their heads in and their tails out; they form a ring; and in order to discipline them to stand in that manner, the drovers are obliged to goad them behind and knock them upon the noses. They strike them with great force upon the nose, and goad them cruelly behind, by which means they form themselves into 'a ring;' so that, at the period I speak of, there is a great deal of unnecessary cruelty. At length the cattle will stand in that manner, so perfectly disciplined, that, at breakfast-time, there shall be twenty or thirty 'rings' of this kind standing in the middle of the market. If the 'ring' is broken by any means, they are all in the greatest anxiety to get in again; and when the drovers are obliged to separate these 'rings,' and drive the cattle away, they have a great deal of trouble, and the labour of the men is excessive to get one single beast out. Indeed, if you can conceive first getting the cattle into 'a ring,' as I have stated, and if one is sold out of the ring at eleven in the day, the beast is ordered to be driven through fifteen hundred cattle, whichever way he goes out of the market, and the man is goading that beast all the way—if you can conceive men compelled to exercise this cruelty, they will not be very delicate of the manner in which they use it after a time!"

'Another witness, who had been "a salesman about eight years," thus described the scene:—

'"I have stood behind eight of these off-droves, and the cruelty which is necessarily exercised to get them to stand properly is very great indeed, and which, by tying up, might be totally removed, and is the cause of the great complaint which exists of the bruises and the wildness of the different animals when passing through the streets. I

The dairies of the metropolis are objects of much interest to the stranger and to the agriculturist. In pursuit of the object of this work we travelled

will describe simply the manner in which it arises. Perhaps more than an hour's violence has been exercised towards the cattle, to get them to stand about twenty in each circle,—and during the whole of this time they are beaten, now about the hocks, and then about the head. If the head turns outward, they are beat about the head till they are turned inward. The great cause of the inhumanity described arises from this circumstance, that when a bullock is driven, perhaps from the centre of the market, by the butchers' drovers, that bullock will run into five, six, seven, eight, or nine of the droves before he gets out of the market: perhaps in every one of the droves that bullock is beat about the head for ten minutes before he can be got out of it again, and then he runs to another drove, from the circumstance of having been so beat about in the early part of the morning. Consequently, perhaps, this bullock is beat out of ten droves before he gets out of the market, to the very great injury of the animal. He is often beaten nearly or quite blind; and when it gets into the public streets, the bullock, irritated by the violence committed, scarcely conscious where he is, runs at any thing, or over every thing, or through every thing. All this would be entirely prevented, if there were room to tie each bullock separately up."

We subjoin, in connection with this, an account of an undertaking of an opulent and benevolent individual, Mr. Perkins, who, at the expense of 100,000*l.*, has erected a cattle-market, in the Lower Road at Islington, which will contain double the number of cattle usually exhibited in Smithfield, and render the cruelties there practised in the packing of them, no longer necessary. The building, so far as it has proceeded, was first thrown open to the inspection of the public, on the 13th of September, 1833.

'The new mart stands upon an area of 22 acres, immediately abutting upon the Lower Road, Islington. The situation is airy and healthy, and is peculiarly appropriate for the purpose, as it is on the high road for the northern and eastern parts of the country, whence the principal supply of cattle for the London market comes. An immense square is enclosed by high walls, around which are erected a continuous range of slated sheds, supported by 244 Doric pillars, under which the cattle may at all times be protected from the severity of the weather. These sheds are subdivided into numerous compartments, with lairs enclosed by oak paling in front, to which the beasts may be either fastened, or allowed to be at liberty, so as to be conveniently subject to the examination of the purchasers. In each lair there is a water-trough, constantly supplied with fresh water, by means of pipes passing under ground, from two immense tanks, which are kept filled by machinery from capacious wells which have been sunk for the purpose. The average length of the sheds is 830 feet, and they are capable of accommodating at least 4,000 beasts, and here they may remain from one market-day to another, or till such times as it may be convenient for the purchasers to remove them—an advantage wholly impracticable at Smithfield.

'The open space in the centre is divided into four quadrangles, intersected by wide passages, and in these quadrangles are to be erected sheep-pens (the materials for which are all ready,) capable of holding 40,000, so placed as to be approached with perfect facility. Other pens are constructed for calves, pigs, and such animals as are usually brought for sale to the cattle-market, upon an obviously simple classification, so as to avoid confusion or irregularity of any sort.

'Every necessary office for salesmen and clerks of the market will be erected in a large area in the centre, and the ingress is obtained through a large arched passage under the market-house, a fine substantial building, with appropriate offices on each side for check-clerks, and with accommodation up stairs, either for the counting-houses of bankers, or public meetings connected with the business of the establishment. To the leads of this house the visitors proceeded, and from thence a full view of the whole market was obtained, as well as of the surrounding country: at once showing the perfect appropriateness and unobjectionable character of the site, which, in point of extent, is four times larger than Smithfield. The piers and layers are all to be paved, if we may use the expression, with hard bricks; and the drainage is so contrived as to ensure perfect cleanliness in the most unfavourable weather.

'*Abattoirs.*—Adjoining the market it is intended to erect abattoirs for slaughtering cattle of every description; in which persons may either be accommodated with private slaughter-houses, or have the animals slaughtered under appointed inspectors at a certain fixed and moderate rate; so that all the expense, inconvenience, and mischief arising from the present mode of driving the cattle through the crowded streets on the market-day may be avoided.

'A market tavern, with stable-yard, stables, and sheds, capable of accommodating the horses of the frequenters of the market, is also to be erected, together with a range of shops for the sale of such things as are calculated to meet the wants of the various classes over the greater part of the United Kingdom; and although we often had no other recommendation than the simple statement of the purport of our journey, we met with very few cases of incivility or of unwillingness to give us the fullest information; but when we returned to our usual residence, and where we expected most facility in the attainment of our object, we will not say that the refusal to admit us was accompanied by rudeness, but the gate of the dairy remained closed. This was the case with our overgrown milk establishments. It was a species of illiberality on which we had not calculated; but it mattered little, for we had seen many of the smaller ones, and we could guess with tolerable accuracy at the difference of treatment in some points—indeed they had been already whispered to us, and we had besides a minute and accurate account of them in the Magazine of our friend Mr. Berry.

The number of cows kept for the purpose of supplying the inhabitants of the metropolis and its environs with milk, is about 12,000. They are, with very few exceptions, of the short-horn breed—the Holderness or Yorkshire cow, and almost invariably with a cross of the improved Durham blood. The universal preference given to this breed by such a body of men, differing materially on many branches of the treatment of cattle, is perfectly satisfactory as to their value, and that on three distinct points.

First, as to the quantity of milk. This we need not press, for the enemies of the short-horns have never contested this point. There is no cow which pays so well for what she consumes in the quantity of milk that she returns.

This, however, is not all, though it may be the principal thing which enters into the calculation of the metropolitan dairymen.

The name of new milk has something very pleasant about it, but it is an article which rarely makes its appearance at the breakfast or tea table of the citizen. That which is got from the cow at night is put by until the morning, and the cream skimmed off, and then a little water being added, it is sold to the public as the morning's milk. The real morning's milk is also put by and skimmed, and being warmed a little, is sold as the evening's milk. This is the practice of most or all of the little dairymen who keep their half a dozen cows; and if this were all, and with these people it is nearly all, the public must not complain: the milk may be lowered by the warm water, but the lowering system is not carried to any great extent, for there is a pride among them that their milk shall be better than that of the merchants on a yet smaller scale, who purchase the article from the great dairies; and so it generally is. The milk goes from the yard of the great dairy into the possession of the itinerant dealers perfectly pure; what is done with it afterwards, and to what degree it is lowered and sophisticated, is known only to these retail merchants.

The proprietor of the large dairy is also a dealer in cream to a considerable extent among these people; he is also a great manufacturer of butter, for he must have milk enough to answer every demand, and that demand is exceedingly fluctuating; then it is necessary that the quality of the milk should be good, in order that he may turn the overplus to profitable account, in the form of cream or butter. The employment of the short-horn cow, in all the dairies, is a convincing proof that her milk is not so poor as some have described it to be.

It is the practice in most of the dairies to fatten a cow as soon as her

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who may be drawn to the spot by their respective avocations. Every possible want has in fact been foreseen, and, as the place is now open for inspection, the public have an opportunity of judging of its utility by personal observation.'

milk becomes less than four quarts a day. They are rarely suffered to breed while in the dairyman's possession. The fact of their being so often changed is a proof that while the cow gives a remunerating quantity of milk for a certain time, she is rapidly and cheaply fattened for the butcher as soon as her milk is dry. Were much time or money employed in preparing her for the market, this system would not answer, and would not be so universally adopted. Fattening and milking properties can, therefore, combine in the same animal, and they do so here.

Mr. Laycock, however, does not adopt this as a general rule. The cows that are more than usually good milkers, are suffered to take the bull when in season. He always keeps some good short-horn bulls for this purpose. It sometimes happens that the cow will continue to give milk until within a few weeks of calving; and he judges, and perhaps rightly, that this is a more profitable course than to fatten and get rid of her, with the probability that he might replace her by a cow that would give a less quantity of milk.

The present market price of a good dairy cow is about 20*l*., but the owners of the small dairies have no little trouble to get a good cow. The jobbers know that they will have a ready market for a considerable portion of their lot in the yards of the great cow-proprietors, and will probably get a larger price than the poorer man would give; and therefore Messrs. Rhodes, or Laycock, or one or two others, have always the first selection. Mr. Laycock has peculiar advantages for obtaining good cattle. In addition to his dairy, he has sheds that will contain five or six thousand beasts. A great proportion of them halt on his premises for a day or two before they are brought into the market. In addition to the shilling a night which he charges for their standing, he claims the milk of the cows as his perquisite. The cows are milked by his people; he therefore knows beforehand the quantity of milk which each will yield, and he is thus enabled to cull the very best of the herd. The dairymen do not like a cow until she has had her third or fourth calf, and is five or six years old; she then yields the greatest quantity of milk, and of the best quality. Two gallons of milk per day is the quantity which each cow is expected to yield in order to be retained in the dairy. Taking one cow with another, the average quantity obtained is rather more than nine quarts.

When she begins to fail in her milk, she is fattened on oil-cake, grains, and cut clover hay, and disposed of. The dairyman calculates on getting something more for her than when he first bought her, but sometimes he meets with an animal that seems to verify the old prejudice against cows in good condition. He bought her for her known milking properties, but she continues so poor that he in a manner hides her in some corner of his dairy. She, however, does her duty; she yields him plenty of milk, but that at length dries up; and he is unable, try what he will, to get much flesh upon her bones, and he sells her for less than half of her first price.

The quantity of milk yielded by all these cows, at nine quarts per day, amounts to 39,420,000 quarts, or 27 quarts of genuine milk for each individual. The retail dealers usually sell the milk for 4*d*. per quart, after the cream is separated from it, and then obtain 3*s*. per quart for the cream; beside this, a great deal of water is mixed with this skimmed milk: so that we far underrate the price when we calculate that the genuine milk sells at 6*d*. per quart, which makes the money expended in milk in the British metropolis amount to 985,500*l*., or nearly a million pounds per annum.

If we again divide the 985,500 by 12,000*l*., (the number of cows,) we shall have the strange and almost incredible sum of more than 82*l*. as the money produced by the milk of each cow. This is divided among a variety of persons, and after all affords but a scanty subsistence to many of them; but it unequivocally proves the rascality that pervades some of the departments of the concern.

We acquit the wholesale dealers of any share in the roguery, nor do we believe that their profits are exorbitant. They sell the milk to the retail dealers at a price that, according to Dr. Middleton, would enable them to clear 64 per cent., without adulterating the article—(we believe that 50 per cent. would be nearer the truth.) When we consider the nature of the business; the distance the milk-girls have to travel; and the time wasted in selling their little quantities from door to door, this profit is not too great; but when they abstract the cream, and add the water, and unless they are much belied, some extraneous and abominable articles, the actual profits will far exceed cent. per cent. In the spring of the year, when London is full, the consumption and the deterioration are greatest. In the latter part of the year the cream is converted into butter, and the butter-milk given to the hogs.

Rhodes's dairy has been established more than thirty years, but some of the same family or name have lived in that neighbourhood nearly a century. 'Mr. Rhodes, farmer, near Islington,' is referred to by Dr. Brocklesby, in his treatise on the murrain which prevailed among cattle, about the middle of the last century. The writer of 'London Dairies,' in the British Farmer's Magazine for February 1831, gives a description of it, of which the following is the substance:—The surface on which the buildings are placed is a gentle slope of two or three acres, facing the east. The sheds run in a direction of the slope, as well for the drainage of the gutters as for the supply of water for drinking, which will thus run from trough to trough the whole length of the shed. The sheds are twenty-four feet wide; the side walls being about eight feet high, with rising shutters for ventilation, and panes of glass let into iron frames for light. The floor is nearly flat, with a gutter along the centre, and a row of stalls, each seven feet and a half wide, along the sides, and adapted for two cows, which are attached by chains to a ring that runs upon an upright rod in the corner of the stalls. A trough or manger of the ordinary size of those used for horses, is placed at the top of the stall. Four of these sheds are placed parallel and close to each other, and in the party walls are openings a foot wide, and four feet high, opposite to each cow. The bottom of these openings is about nine inches higher than the upper surface of the troughs, and contains a one-foot square cast-iron cistern, which contains the water for drinking; each cistern serves two cows that are placed opposite to each other, but in different sheds: all these cisterns are supplied from one large tank. These cisterns have a wooden cover, which is put on while the cows are eating their grains, to prevent their drinking at that time, and tainting the water by dropping any of the grains into it. At the upper end and at one corner of this quadruple range of sheds is the dairy, consisting of three rooms, each about twelve feet square; the outer, or measuring-room—the middle, or scalding-room, with a fire-place and a boiler—and the inner, or milk and butter room.

At the lower end of the range is a square yard surrounded by sheds, some for fattening the cows when they have ceased to give milk, and the others for store and breeding pigs. The pigs are kept to consume the casual stock of skim-milk which remains on hand, owing to the fluctuations of the demand. The milk is kept in a well, walled with brick laid in cement, about six feet in diameter, and twelve feet deep. The milk soon becomes sour there, but is then most nourishing to the hogs. Breeding swine is thought to be the most profitable, and the sucking pigs are sold for roasting.

Beyond this yard is a deep pit or pond, into which the dung is emptied. There is a stack-yard, sheds, and pits for roots, straw, and hay; a place for cutting chaff, cart-sheds, stables, and every building which such an establishment can require. The number of cows varies from four to five hundred.

The treatment of the cows is singular in some respects. The cows are never untied while they are retained as milkers. Some of them have stood in the stall more than two years. Mr. Laycock, on the contrary, turns his cows out once every day to drink from troughs in the yard, and they remain out from half an hour to three hours, depending on the weather and the season of the year. From the end of June until Michaelmas, they are turned into the fields from six o'clock in the morning until twelve or one, and from two o'clock in the afternoon till about three o'clock on the following morning. Mr. Rhodes's cows have always water standing in the cisterns before them.

We can readily conceive that, from the want of exercise, and consequent cutaneous perspiration, Rhodes's cows may give a somewhat greater quantity of milk than Laycock's; but on the other hand, when we think of an animal tied in the corner of a stall for twelve, or eighteen or twenty-four months together, we cannot help associating the idea of disease, or tendency to disease at least, with such an unnatural state of things; the feet and the digestive system would particularly suffer, and we should suspect a little vitiation of all the secretions, and some deterioration in the quality of the milk. We should like to know the comparative state of health of the animals in the two establishments. The inclination of our opinion would be strongly in favour of Mr. Laycock's plan.

The principal food of the cows in both of these, and in all the dairies of the metropolis, is grains; and as the brewing seasons are chiefly in autumn and spring, a stock of grains is generally laid in at those seasons for the rest of the year. The grains are laid up in pits, lined with brick-work set in cement, from ten to twenty feet deep, and of any convenient size. They are firmly trodden down, and covered with a layer of moist earth, eight or nine inches thick, to keep out the rain and frost in winter, and the heat in summer. A cow consumes about a bushel of these grains daily, the cost of which is from fourpence to fivepence, exclusive of carriage and of preservation. The grains are, if possible thrown into the pit while warm and in a state of fermentation, and they soon turn sour, but they are not liked the worse by cattle on that account; and the air being perfectly excluded, the fermentation cannot run on to putrefaction. The dairymen say that the slow and slight degree of fermentation which goes on, tends to the greater developement of the saccharine and nutritive principle, and they will have as large a stock upon hand as they can afford, and not open the pits until they are compelled. It is not uncommon for two years to pass before a pit of grains is touched, and it is said that some have lain nine years, and been perfectly good at the expiration of that period. The dairyman, however, must know his brewer, and be able to depend on him. The grains from a large ale brewery are the most nourishing. Those from the porter brewery are not so good; and those from the little brewers, who first draw off their ale, and afterwards extract every particle of nutriment in the formation of table beer, are scarcely worth having.

Each cow is allowed a portion of salt. In Rhodes's establishment it is given with the grains. Laycock salts his rick when it is first made;—a most excellent plan, for the hay is not only effectually secured from becoming mow burnt or mouldy, but it is rendered more grateful to the animal, and we may venture to say, almost doubly nourishing, from the developement of the saccharine principle. It is to be doubted, however, whether the cows obtain a sufficient quantity of salt in this way. Some should be given with the grains.

The grains are usually given about three o'clock in the morning, and two o'clock in the afternoon, being a little before the usual milking hours. Between the milkings they have green meat, as long as the season will permit. Cut-grass is a favourite and excellent food; but where it can be managed, the plan of Mr. Laycock to let the cows cut the grass for themselves is a far superior one. Tares come in before the grass, and are afterwards given alternately with it. In winter, turnips, potatoes, and mangel-wurzel, are given as long as they can be obtained at any reasonable price, and then the dairyman is driven to hay or chaff: the superiority of chaff is now generally allowed.

Both of these gentlemen fatten off their dry cows with grains, oil-cake, and clover-chaff, to which Mr. Laycock adds boiled linseed. Our readers may recollect the experiments made by the Duke of Bedford on the fattening quality of linseed, boiled and unboiled. (p. 213,) and in which the simple unboiled linseed fattened the animals more expeditiously than any cooked preparation of that seed. Mr. Laycock boils the linseed in a common boiler, and when reduced to a pulp, conveys it by tubes into large wooden cisterns, where it is mixed with clover chaff roughly cut, and sometimes with grains.

The wholesale dairymen usually agree with the retail dealers, that they (the dealers) shall milk the cows. The dealer knows the quantity of milk that he wants, and the dairyman knowing the usual quantity of milk yielded by each cow, calculates what number of cows will meet the demand, and the retail dealer attends at three o'clock in the morning and two in the afternoon, to milk these cows. He carries it into the measuring-room, where its precise quantity is ascertained. If, as cows often vary considerably in their flow of milk in the course of two or three days, he has milked more than his quantity, it is put into a vessel belonging to the dairyman; or if the cows should not have given their usual supply, the deficiency is made up from the dairyman's vessel. The milk which is left on hand is put into shallow vessels, the cream is skimmed and made into butter, and the skimmed-milk thrown into the pit for the hogs.

The Joint Stock dairies, which a few years ago sprung up in such abundance, have either ceased to exist, or the number of cows, much diminished, have fallen into private hands. While there were many partners, and the business was controlled by a committee of perons who knew nothing at all about the matter, they all proved to be lamentable failures. Some of them, even in the hands of private individuals, who brought with them little or no experience, were sadly ruinous concerns. The metropolitan dairy was a striking illustration of this; but now, under the management of those who have been drilled into the business, it is doing better.

SURREY.

This county, like Essex and Middlesex, cannot be said to have any distinguishing breed. The short-horns undoubtedly prevail; but in the parts bordering on Sussex, the valuable breed of that county is found in great numbers. In some parts of the county, particularly in the neighbourhood of Reigate, the Devons are the favourites; but there are to be found cattle of every breed, and crosses of every kind. Many calves are reared for the London market about Chobham and Bagshot, and some few about Esher and Ripley; but the business has been found to be not so productive as it was once imagined to be, and has declined, particularly in the two latter places.

CHAPTER VIII.

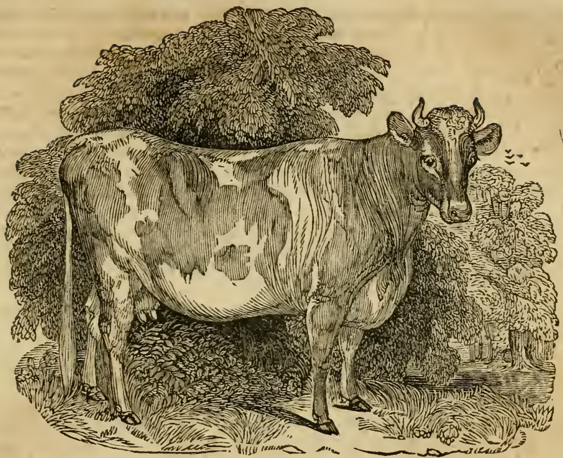
THE FOREIGN BREEDS OF CATTLE.

[*The Alderney Bull.*]

ALDERNEY CATTLE.

First among them—and a regular importation of which is kept up—we have the Normandy, or Alderney cattle. The Normandy cattle are imported from the French continent, and are larger and have a superior tendency to fatten; the others are from the islands of the French coast; but all of them, whether from the continent or the islands, pass under the common name of Alderneys.

Except in Hampshire, they are found only in gentlemen's parks and pleasure-grounds, and they maintain their occupancy there partly on account of the richness of their milk, and the great quantity of butter which it yields, but more from the diminutive size of the animals. Their real ugliness is passed over on these accounts; and it is thought fashionable that the view from the breakfast or drawing room of the house should present an Alderney cow or two grazing at a little distance.



[*The Alderney Cow.*]

John Lawrence describes them as ‘ light-red, yellow, dun or fawn-coloured; short, wild-horned, deer-necked, thin, and small boned, irregularly, but often very awkwardly shaped.’

Mr. Parkinson, who seems to have a determined prejudice against them, says that ‘ their size is small, and they are of as bad a form as can possibly be described; the bellies of many of them are four-fifths of their weight: the neck is very thin and hollow; the shoulder stands up, and is the highest part; they are hollow and narrow behind the shoulders; the chine is nearly without flesh; the hucks are narrow and sharp at the ends—the rump is short, and they are narrow and light in the brisket.’ This is about as bad a form as can possibly be described, and the picture is very little exaggerated, when the animal is analyzed point by point; yet all these defects are so put together, as to make a not unpleasing whole.

The Alderney, considering its voracious appetite—for it devours almost as much as a short-horn—yields very little milk. That milk, however, is of an extraordinary excellent quality, and gives more butter than can be obtained from the milk of any other cow. Of this no one can doubt who has possessed any Alderney cows. Some writers on agricultural subjects have, however denied it. The milk of the Alderney cow fits her for the situation in which she is usually placed, and where the excellence of the article is regarded, and not the expense: but it is not rich enough, yielding the small quantity that she does, to pay for what she costs.* On the coast of Hampshire, there is great facility in obtaining the Alderney cattle, and they are great favourites there. We must refer our readers to the ‘Description of Hampshire,’ p. 215, for the manner in which they have established themselves in that part of the country, and the various ways in which other breeds have been crossed by them.

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* John Lawrence says that an Alderney cow that had strayed on the premises of a friend of his and remained there three weeks, made 19lbs. of butter each week; and the fact was held so extraordinary, as to be thought worthy of a memorandum in the parish books.

One excellence it must be acknowledged that the Alderneys possess when they are dried; they fatten with a rapidity that would be scarcely thought possible from their gaunt appearance, and their want of almost every grazing point, while living. The Duke of Bedford exhibited a French ox at the Smithfield cattle show, in 1802, whose four quarters weighed 95 stones 3 lbs., and the fat 17 stones 3 lbs., Smithfield weight.

Some have assigned to the Norman cattle a share in the improvement of the old short horns; but the fact does not rest on any good authority.

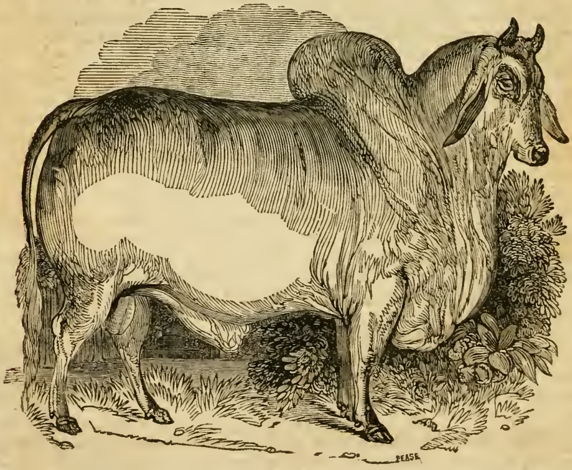
EAST INDIAN CATTLE.

Several varieties of these have been imported, and attempts made to naturalize them, but with varied success.

NAGORE CATTLE.

A bull and cow were exhibited at the Christmas cattle show, in 1832, under the denomination of Nagore cattle. They were beautiful animals, and attracted much attention. They were the property of Henry Perkins Esq., of Springfield, near Wandsworth, to whom we are indebted for the substance of the following account of them.

They were bred by Lieutenant-Colonel Skinner, at his farm at Danah near Pokah, on the borders of the Bichaneer desert, 100 miles to the westward of Delhi. They are not buffaloes, but of the highest breed of Indian cattle. They are used in India by the higher orders, to draw their state carriages, and are much valued for their size, speed, and endurance, and sell at very high prices. These specimens arrived at Calcutta, a distance



[*The Nagore Bull.*]

of 1400 miles, in January, 1829, and were then something under six months old. They were sent as a present to Mr. Wood, who was then residing at Calcutta, and by whom they were forwarded to Mr. Perkins.

Colonel Skinner has a large stock of them; and six or seven beasts are always kept saddled to carry the military despatches. They remain saddled three or four hours, and if not wanted in that time, fresh ones are brought out to relieve their companions. They will travel, with a soldier on their back, 15 or 16 hours in the day, at the rate of six miles an hour. Their action is particularly fine—nothing like the English cattle, with the sideway, circular action of their hind legs—the Nagore cattle bring their hind legs under them in as straight a line as the horse. They are very active, and can clear a five-barred gate with the greatest ease. Mr. Perkins has a calf which has leaped over an iron fence higher than any five-barred gate; and the bull frequently jumps over the same fence in order to get at the water, and when he has drunk his fill, leaps back again.

The bull (Jupiter) was in high condition when exhibited. He was employed in a light cart, and various jobs about the farm: sometimes he goes fore-horse in the wagon-team, to deliver corn; he also drags the bush-harrow, and draws the light roller over the ploughed land. He is very docile and tractable, when one man drives him, and attends upon him, but he has, now and then, shown symptoms of dislike to others.

He is fed entirely on hay. Except that when he works, a little bran is given to him, and in the turnip season he is treated occasionally with a few slices of Swedes, of which he is very fond. He was at first very troublesome to shoe; and it was necessary to erect a break in order to confine him. He was unwilling to go into it for some time, but now walks in very contentedly.

He is very fond of being noticed; and often, when he is lying down, if any one to whom he is accustomed goes and sits down upon him, and strokes him over the face, he will turn round, and put his head on their lap, and lie there contentedly as long as they please.

Mr. Perkins very properly observes, that the chief advantage of these Brahmin bulls would probably consist in their speed and strength, in both of which they surpass any of our breeds.

The cow (Iö) is at grass with the milch cows, and comes up with them morning and evening, when they are driven to be milked; but Mr. Perkins has not ventured to have her milked, on account of the probable danger of the attempt: the value of these cattle for the pail is therefore unknown. Two calves have been bred from them, and a milch cow is now in calf by the bull.

Neither of the calves is yet old enough, or ready, for the butcher, and therefore the quality of the meat is unknown; but, a strong perfume being left upon the hand when it passes over them, there may possibly be a peculiar taint in the meat.

BUFFALO AND INDIAN CATTLE.

Mr. C. Winn, of Nostal, near Wakefield, has some cattle, the progeny of a zebra bull and a Brahmin cow. They breed once in the year, and the calf is suffered to run with the mother as long as it pleases. Some of them have been castrated, but with little development of form or improvement of meat. When fattened, they weigh from 25 to 30 stones. One was killed, weighing more than 35 stones, imperial weight. The bone is exceedingly small, but the meat is not well-flavoured, and is comparatively destitute of gravy. They have bred with the English cattle, but the offspring has never been reared. A calf from an Ayrshire cow, by one of these bulls, became so fat at one month old, that it weighed 25 lbs. per quarter, and was most delicious meat.

The Duke of Nothumberland has a fine breed of buffalo-cattle in his beautiful park at Alnwick. They are not, however, the pure Indian breed, but a cross with the Highland Kyloe, the original bull having died soon after their arrival at Alnwick, more than twenty years ago. They have never been allowed to increase much above their present number, about 30, and only one or two bulls are suffered to be among them at one time. They have promiscuously bred among each other, care being taken to preserve those for breeders which most resembled the originals, the size of the characteristic hump on the shoulder being the principal guide.

They are treated in a great measure like the other cattle, only, from their wild nature, no attempt has been made to handle them. During severe weather, or a storm in winter, they have a hovel to run into; and although they do not seem to bear the cold climate so well as one of their progenitors, the Kyloes, they are usually very healthy.

When the calves are dropped, the mother endeavours to secrete them among the long grass for a few days, like other wild cattle, so that the herdsman has to watch the place, and a favourable opportunity, to castrate or spay them.

They are good graziers; the young ones getting into excellent condition in the summer; and although they evidently lose flesh in the winter, yet by the time they are killed in the fall of the year, when four or five years old, they are very good beef. The meat is finely marbled, and well-flavoured.

In Wentworth Park, the principal seat of Earl Fitzwilliam, there is a herd of beautiful Indian cattle. They were presented to Lord Rockingham, sixty or seventy years ago, by Mr. Verelst, who was at that time Governor of Bengal. They have been occasionally killed for the table, but their flesh had a peculiar sweetish taste, not pleasant to every palate. Two years ago some of the calves were castrated, in order to see how they would answer as grazing cattle; they are not yet old enough to kill, but they do not appear to thrive so well as those that were left in their natural state. In winter they are driven into a yard with sheds; for they would nearly starve on the open ground. No cross has been attempted between these and the cattle of the country, from an impression on the mind of the noble proprietor, that it would be more a matter of zoological curiosity than of practical utility.

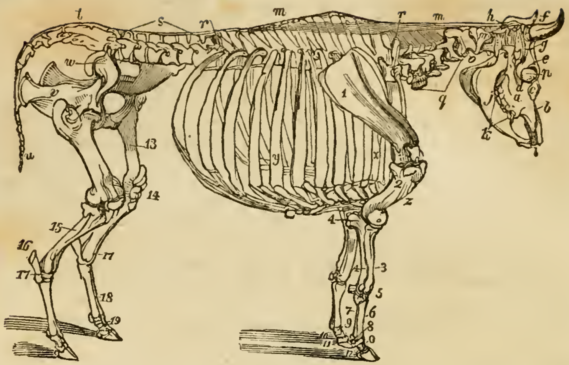
THE
ANATOMICAL STRUCTURE
AND
DISEASES OF CATTLE.

CHAPTER IX.

THE STRUCTURE AND DISEASES OF THE HEAD OF THE OX.

Having described the various breeds of cattle, and touched incidentally on some of the principles of breeding, the method of rearing young stock, and the general management of the ox, we are prepared to enter into the consideration of his structure. This will afford us opportunity of more satisfactorily elucidating the peculiarities, or *points*, on the development of which the excellence of the beast, for certain purposes, is supposed to depend; and will also enable us to understand the nature and proper treatment of the diseases to which neat cattle are subject. The first is an important but disputed topic: it has been founded too much on mere assertion; it has varied with the caprice of individuals, or the fashion of the day; and it has rarely been referred to principle, and to the necessary effect of certain conformations on the capacity of the animal for certain purposes: the latter, more important still, has been altogether neglected, for until lately there did not exist, in the English language, and scarcely in any other, a scientific and satisfactory account of the nature and causes and cure of the maladies of neat cattle; but these animals were, with few exceptions, abandoned to the tender mercies of those whose practice may be characterized as a compound of ignorance and brutality.

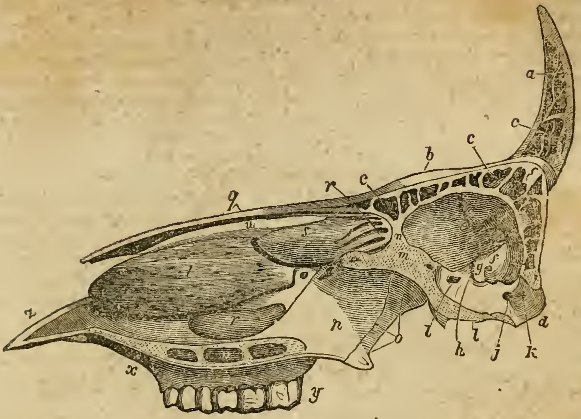
We should have endeavoured to make this part of our work perfect, without reference to any other; but having, in our Treatise on 'the Horse,' entered into a laboured description of the different parts of the frame of that quadruped, we shall avoid repetition, by occasional reference to that portion of the Farmer's Series: and shall be enabled to make our anatomical detail as brief as a clear understanding of the medical treatment of cattle will admit, and consisting of that only which is peculiar to cattle. For the purpose of future reference, and in conformity with the treatise on 'the Horse,' we first introduce the skeleton of the ox.



[*Skeleton of the Ox.*]

a, The upper jaw-bone.
b, The nasal bone, or bone of the nose.
c, The lachrymal bone.
d, The malar, or cheek-bone.
e, The frontal bone, or bone of the fore-head.
f, The horns, being processes or continuations of the frontal.
g, The temporal bone.
h, The parietal bone low in the temporal fossa.
i, The occipital bone, deeply depressed below the crest or ridge of the head.
j, The lower jaw.
k, The grinders.
l, The nippers, found on the lower jaw alone.
m, The ligament of the neck, and its attachments.
n, The atlas.
o, The dentata.
p, The orbit of the eye.
q, The vertebræ, or bones of the neck.
r, The bones of the back.
s, The bones of the loins.
t, The sacrum.
u, The bones of the tail.
v & *w*, The haunch and pelvis.
x, The eight true ribs.
y, The false ribs; with their cartilages.
z, The sternum.
1, The scapula, or shoulder-blade.
2, The humerus, or lower bone of the shoulder.
3, The radius, or principal bone of the arm.
4, The ulna, its upper part forming the elbow.
5, The small bones of the knee.
6, The large metacarpal or shank-bone.
7, The smaller or splint-bone.
8, The sessamoid bones.
9, The bifurcation at the pasterns, and the two larger pasterns to each foot.
10, The two smaller pasterns to each foot.
11, The two coffin-bones to each foot.
12, The navicular-bones.
13, The thigh-bone.
14, The patella, or bone of the knee.
15, The tibia, or proper leg-bone.
16, The point of the hock.
17, 17, The small bones of the hock.
18, 18, The metatarsals, or larger bones of the hind leg.
19, 19, The pasterns and feet.

The head of the ox may be divided, like that of the horse, into two parts—the skull and the face. The following cut represents a section of both.



[*Section of the Head of the Ox.*]

a, The horn, showing it to be a process of the frontal bone, and the manner in which it is hollowed.
b, The frontal bone.
c, The frontal sinus, extending from the nasal bone almost to the tip of the horn and the great foramen.
d, The condyloid process of the occipital bone, and the foramen through which the spinal chord passes from the skull.
e, The cavity of the skull.
f, The petrous portion of the temporal bone appearing in the cavity of the skull.
g, The passage to the internal part of the ear.
h, The foramen lacerum or irregular foramen through which several of the nerves escape from the space and some of the blood-vessels enter.
i, The foramen ovale—oval foramen.
j, The anterior condyloid foramen.
k, The posterior do.
l, The basilar process of the occipital.
m, The sphenoid bone.
n, The crista galli of the ethmoid bone.
o, The pterigoid bone.
p, The perpendicular portion of the palatine bone.
q, The nasal bone.
r, The ethmoid bone.
s, The superior turbinated bone.
t, The inferior turbinated bone.
u, The lower cell of the ethmoid, so large in the ox, as to be termed by some the middle turbinated bone.
v, The maxillary sinus.
w, The cells of the palatine bone.
x, The superior maxillary bone—its palatine process.
y, The grinders.
z, The anterior maxillary bone, destitute of incisor teeth.

The cranium or skull, that portion of the head which contains and protects the brain, is composed of eight bones: two frontals *e*, p. 272, and *b*, p. 273; one parietal, *h*, p. 272; two temporals, *g*, p. 272, and *f*, p. 273; one occipital, *i*, p. 272; and *d* and *l*, p. 273; one ethmoid, *n*, and *r*, p. 273; and one sphenoid, *m*, p. 273.

The difference in the appearance of the head of the ox, and the horse, is principally caused by the different extent and form of the frontal and parietal bones; while in the horse, (see *a* and *c*, p. 66 of the 'Horse') the frontal bones extend but little more than half way from the orbit of the eye to the top of the head; and above them, the parietals, thickly covered by the temporal muscles, form the arch-shaped roof of the skull; in cattle, the frontal bones extend from the nose to the superior ridge of the skull; presenting a flattened but irregular surface, and entirely bare of muscular or fleshy covering. In the fœtal calf, there are two distinct frontals, but the suture soon disappears, and one broad and lengthened bone remains.

THE FRONTAL BONES.

Nature has given to most species of cattle a formidable weapon of offence, the horn. To be effective, it must be securely based; and it could only be so, or it could best be so, by this expanse of frontal bone. From this bone the horn springs, and it is in fact a continuation of the frontal, (see *a*, p. 273.) To the male animal this weapon seems to be most necessary, or by him it is most used: he is, in his wild state, the natural and the courageous guardian of the herd, and many a contest he has with his fellows before he establishes his supremacy over them, and his right to be their protector: therefore, in order to give a firmer basis to that by which alone he could maintain his power, or defend his subjects, the forehead of the bull is considerably shorter and broader than that of the cow or the ox. It is so in every breed.

The Ayrshire cow is distinguished by her small head, and lengthened narrow brow; but the bull (see cut p. 129) has as broad and masculine a forehead as any of them; and the animal, whose portrait is there represented, was too furious and impatient of control to be safe. It was necessary always to confine him, and even under confinement, he was a perfect nuisance by his bellowing.

This shortness and breadth of forehead is not only characteristic of difference of sex, but it is regarded, and properly, as an essential point in a bull. A deficiency here argues deficiency of constitutional power, and materially diminishes his value as a stock-getter; we do not recollect an exception to this rule: and on the other hand, we have rarely seen a cow with a large head and broad forehead that had not, in other respects, lost the most valuable points of the feminine character—she was neither a good milker, nor a good mother, nor did she often fatten kindly; there was a coarseness in her whole form, and her very flesh was coarse when she came to be slaughtered.

We have said that the smallness of the head in the horse or mare, however it may be considered to be a point of beauty, is very questionable in its bearing on the temper, and actual value of the animal; but we believe that there is no point more generally assented to by breeders than this—that a fine small head, tapering towards the muzzle, usually indicates a good milker and a good feeder, and a good temper too.

We present our readers, in the next page, with a cut of the head of Lord Althorp's bull, whose full portrait was given in page 242. With the exception of somewhat too narrow a muzzle, it is a good illustration of the masculine character of a superior bull of the improved short-horn breed.

With regard to some species of hornless cattle, this notion of the proper form of the frontal bone, is carried to a greater extent. The expanse of this bone not being wanted as a base for the horn, is not found; on the contrary, the frontal bones begin to contract a little above the eyes, and terminate in a comparatively narrow ridge at the summit of the head.

This narrowness of the parietal ridge (is not the occipital ridge in cattle, for the occipital bone is pushed out of its place, and the parietal occupies the situation of the superior portion of it) is deemed a characteristic of the purity of the breed and its grazing qualities. This is particularly the case among the Galloway and Angus breeders. We believe that there is some truth in this. It is a kind of pledge as to the fineness of the form, and the smallness of the bone everywhere.

[*Head of* Firby—*Lord Althorp's Bull.*]

THE FRONTAL SINUSES.

If this expanse of bone were solid, its weight would be enormous, and it would fatigue and weigh the animal down. To obviate this, as in the Horse (*b*, p. 68, 'Horse,') it is divided into two plates, separated by numerous vacuities or cells; but, unlike the horse, these extend through the whole of the bone—nay, they penetrate even through the parietal and occipital bones. Hence it happens that the *frontal sinuses* (so these cavities are called in cattle as well as in the horse) extend from the angle of the eye to the very foramen through which the brain escapes from the skull, nay, as we shall see presently, to the very tip of the horn (vide *a* and *c*, p. 273.)

There is the same septum, or division, in the centre of the frontal sinuses as in the horse; but there is not the same perfect division between the nostrils. Commencing about half way up the nose, the septum is wanting at the lower part, and the two nostrils are, as it were, thrown into one; and the frontal sinuses communicating with the frontal, and the frontal with the nasal, there is one continuous cavity from the muzzle to the tip of the horn, and from one muzzle to the other.

INFLAMMATION OF THE FRONTAL SINUSES.

The whole of this cavity is lined by a prolongation of the membrane of the nose, and when one part of it is inflamed, the whole is apt to be affected.

This accounts for the very serious character which nasal gleet, a discharge from the nostril, sometimes assumes in cattle. In the horse we think little of it, except it has a glanderous character, or is connected with considerable cough or fever; but the sooner a gleet from the nose of an ox is examined into and properly treated the better; for the inflammation is far more extensive than that which occurs in the horse.

After a little cough, with slight nasal discharge, we occasionally find the beast rapidly becoming dull and drooping, and carrying his head on one side. Either grubs or worms have crept up the nostril, and are lodged in some of the sinuses, and are a source of irritation there; or inflammation, at first merely that of the membrane of the nose, and connected with common cold, has extended along the cavity, and is more intense in some particular spot than in others; or has gone on to suppuration, and matter is thrown out and lodged there, and generally about the root of one of the horns. The veterinary surgeon does one of two things; he either opens the skull at the root of the horn with a trephine, or he proceeds in a more summary and a better way—he cuts off the horn at its root. More than a pint of pus has sometimes escaped from the orifice; and although there may not have been any suppuration and throwing out of pus, yet the inflammation will be materially relieved by the bleeding that necessarily follows such an operation. The opening into the sinus which is thus made should, however, be speedily closed, or the stimulus of the atmospheric air will render the inflammation worse than it was before.

On account of the vast extent of cavity from the communication between all the partitions of the sinus, the ox occasionally suffers much from the larva of a species of fly that creeps up the nose and lodges in some part of the sinus. He is tortured much more than the sheep from this cause; and the annoyance is sometimes so great as to be scarcely distinguished from phrenitis. This, however, does not often happen; for the sinuses of his skull are more the accidental than the natural and regular habitation of these insects.

THE USE OF THESE SINUSES.

These plates of the skull are separated from each other at least an inch at all places, and in some parts more than double that distance (see cut, p. 273.) Do we not see the design of this? The skull is the covering of the brain. The weapons of offence in cattle spring from the skull, and they are often used with terrible effect, and more about the skull than any other part. Even the polled cattle use their heads as weapons of offence, and sometimes butt each other with tremendous force. From the expanse of the forehead, the roof of the skull cannot be covered and defended by the yielding but most effectual resistance which the temporal muscle affords to the horse; and although the frontal bone were so solid as almost to resist the very possibility of fracture, yet if the brain lay immediately underneath it, the concussion that would result from the shock of their rude encounters would always be dangerous, and often fatal. Therefore the bones are divided into two plates, and separated as widely as possible from each other, where, as at the parietal crest, and the root of the horn, the shock is most likely to fall. There are also inserted between the plates numerous little perpendicular walls, or rather scales of bone, (see *c*, p. 273.) (for many of them are of wafer-like thinness,) which, by their number, give sufficient support to the outer plate in all ordinary cases, and by their thinness and elasticity afford a yielding resistance similar to that of the temporal muscle in the horse, and capable of neutralizing almost any force. Thence it happens that if the external plate is fractured, the inner one is seldom injured; or if the external one is perforated by the horn, the inner one is rarely touched. Hence also it occurs that in the occasional encounters between these animals—and furious enough they sometimes are—the injuries are inflicted on other parts, and the head is comparatively untouched. Old and vicious beasts seem to be aware of this, and aim their thrusts at the side or the flank.

THE FORAMINA OF THE FOREHEAD.

There are some marks of contrivance in the structure of the head of the ox, which should not be entirely passed over. At *b*, (p. 66, 'Horse,') are seen the two foramina or holes through which the nerves and blood vessels pass out to supply the forehead: but so much larger an expanse as that of the forehead of the ox requires more nervous influence, and a greater supply of blood; and, therefore, there are two foramina, one for the escape of the nerve, and the other of the artery. Each of these, however, must be of considerable bulk, and they have to run over a flatter surface than in the horse, and a surface, passing over which, they are exposed to much danger. There is provision made for this. A curious groove is formed, in which they run for a considerable distance above and below, securely defended by the ridge of bone on either side, until they have given off various branches, and are either so diminished in bulk, that they are comparatively out of the reach of injury, or if one branch, whether of the nerve or the artery were injured, the nervous influence and the blood would be supplied by other ramifications.

THE ARCH UNDER WHICH THE TEMPORAL MUSCLE PLAYS.

In the cut (p. 66, 'Horse,') and better seen in the cut in the next page of that work, a strong process of the frontal bone goes to contribute to the formation of the *zygomatic arch* under which the head of the lower jaw moves and is defended; and not only the act of mastication is thus securely performed, but there is so much room for the play of the muscle, that the animal is enabled to use his teeth as weapons of offence. In the ox the teeth are never weapons of offence; he may gore and trample upon his enemy, but he does not bite him: and his food is more leisurely gathered in the first imperfect mastication, and still more lazily and sleepily ground down in rumination; this arch therefore needs not to be, and is not so capacious and so strong. It is likewise, from its situation and the general shape of the head, exempt from the violence and injury to which in the horse it is exposed; and therefore the arch not only does not project like the other for the purpose of strength, and to give room for a mass of muscle that is not wanted, but the frontal bone does not enter into its composition at all. (See *g* and *e*, p. 272.)

THE HORNS.

The greatest difference between the frontals in the ox and the horse, consists in their prolongation in the former, under the name of the horns. The fœtus of three months old has no horn; during the fourth month it begins to appear, and may be detected by a little irregularity of the frontal bone. This increases, and by the seventh month it is evident to the eye under the form of a distinct tubercle elevating the skin. It now gradually forces its way through the cutis or true skin, which it has accomplished at the time of parturition; and, continuing to grow, it detaches the cuticle or scarf skin from the cutis, and carries it with it; and this gradually hardening over it, forms the rudiment of the future horn or the covering of the bone. Beneath this cuticle the horn soon begins to form; but it continues covered until the animal is twelve or fifteen months old, giving to it a skinny roughness, which then peels off showing the shining and perfect horn. The horn of the ox then is composed of an elongation of the frontal bone, covered by a hard coating originally of a gelatinous nature. Its base is a process, or continuation of the frontal bone, and it is, like that bone, hollow or divided into numerous compartments or cells, (*a* and *c*, p. 273) all of them communicating with each other, and lined by a continuation of the membrane of the nose.

The bone of the horn is exceedingly vascular; it is the most vascular bone in the whole frame, for it has not only to carry vessels for its own nourishment, but for that of its covering; it is therefore much roughened on its surface, and has the appearance of being perforated, or, as it were, worm-eaten by innumerable vessels. It is on this account that when it is broken the hæmorrhage is so great—there would scarcely be more profuse bleeding from the amputation of a limb. A veterinary friend of ours had to remove a large half-bony tumour, which had grown on a broken horn. He sawed it off, and the blood flew out in a stream as large as his finger; and it was only by the repeated application of large budding irons, heated red-hot, that he was able to arrest the bleeding.

FRACTURE OF THE HORN.

Young bullocks will often make too early use of their horns, and many are the desperate encounters before it is determined who is master of the pasture. In this way the horn occasionally gets fractured. If the bone of the horn is evidently broken, but the external covering is not displaced, nothing more is necessary than to fix some splents to the part, and bind the whole well up, so that the fractured edges shall be kept securely in apposition with each other, and in a fortnight or three weeks all will be well.

Sometimes the horny covering is torn off. If the bone is not fractured it will be best to leave the process to nature. Young beasts are particularly subject to this loss of the covering of the bone, from their violent contests with each other. There will be a great deal of hæmorrhage at first; but this at length ceases and leaves the bone covered by coagulated blood. This by degrees hardens and forms a temporary case for the bone. In the mean time another process commences at the base of the bone. A dense flexible substance is found there, of the nature of which we shall say more presently, and this begins rapidly to thicken and harden, and to assume the character of good horn; it then runs up the bone, displaces the crust of coagulated blood as it grows, and, in a less time than would be thought possible, covers the bone completely, and, much resembles in appearance, and is nearly as strong as, the original horn.

At other times, after the horny covering has been torn off, the bone will be found to be fractured, but the parts are not perfectly separated from each other. They must be brought in exact apposition with each other, bound carefully up, and confined with splents, or sufficiently strong bandages. Union between the divided edges of the bone will speedily take place, new horn will grow over, and there will be scarcely a vestige of the accident.

At other times, not only is the horny covering torn off, but the bone is also snapped asunder and perfectly separated. The bone will never be reproduced; although nature will often attempt to do it, and a rude misshapen mass will be formed, half bony and half cartilaginous. To prevent this the horn must be sawed off level below the fracture, and the nearer the head the better, because it will be the sooner covered by a prolongation of the cuticle. The hot iron must be frequently passed over the level surface, after which this effort at reproduction will seldom be attempted; or, if it is, the first granulations may be easily destroyed by the cautery, and there will be an end of the matter. As soon as the bone has been sawn off level, and the hæmorrhage stopped, and the cautery applied to the exposed surface, the part must be bound up as quickly as possible, and with one tar-cloth above another, so as completely to exclude the access of atmospheric air: for although the air has never been quite shut out from the frontal sinuses, owing to their communication with the nostrils, yet it has not had free access there; and being now admitted unrestrained to a membrane so extensive and so irritable, it may produce dangerous inflammation. The cases are not unfrequent in which inflammation of the brain or tetanus have followed a broken horn, and precisely from this cause—the exposure of the lining membrane of the cells of the head to the unaccustomed stimulus of the air.

COMPOSITION AND GROWTH OF THE HORNY COVERING.

The horny covering is composed of albumen with a little gelatine, and about half per cent. of phosphate of lime. The ingredients are the same as in the hoof of the horse, but there is rather more albumen which gives the superior hardness to the horn. There is very little earthy matter in the horn. It does not yield by calcination more than one three-hundredth part; in fact, every thing is excluded that can impart to it the slightest degree of brittleness.

After long maceration the horn has been resolved into lamellæ or thin plates; but no nerves or blood-vessels have been found in it, although they must exist there, or the process of nutrition and growth could not be carried on. The horn is exceedingly thin at its base, and appears as if it were a continuation of the cuticle. The most careful dissection cannot trace any separation between them; but maceration has shown one, and has proved that the cuticle and the covering of the bone of the horn are two distinct substances. As from the coronary ligament at the upper part of the foot of the horse, and which is connected with the cuticle, or is rather a thickened bulbous prolongation of it, the hoof, or a portion of it is secreted, so, in the ox, from a less distinct prolongation of the cuticle proceeds the covering of the bone of the horn, or at least the basis of it. The rings at the base of the horn, and which gradually recede from the base, prove this: but the horn, like the hoof of the horse, thickens as it grows down, and this thickening, and in fact the greater portion of the horn, are derived from the vascular substance that surrounds the bone, and which is fed by the innumerable vessels, that are interposed between it and the horn. This substance, dense, vascular, filamentous, reticulated, is very easily demonstrated by dissection; but there is not the same closeness of connexion, or the mutual interposition of horny and sensible laminæ, because there is not the same stress upon them, viz., the whole weight of the horse to support.

RINGS OF THE HORN.

These rings, proving the first growth of the horn from the base, have been considered as forming a criterion by which to determine the age of the ox. At three-years-old, the first distinct one is usually observed: at four-years-old two are seen, and so on, one being added on each succeeding year. Thence was deduced the rule, that if two were added to the number of rings the age of the animal would be given.

These rings, however, are perfectly distinct in the cow only; in the ox they do not appear until he is five years old, and they are often confused: in the bull they are either not seen until five, or they cannot be traced at all. These rings are not always distinct even in the cow; the two or three first may be so, but then comes a succession of mere irregularities of surface that can scarcely be said to be rings and which it is impossible to count. Another circumstance must also be taken into the account, that if a heifer goes to the bull when she is two-years-old, or a little before or after that time, there is an immediate change in the horn, and the first ring appears; so that a real three-year-old would carry the mark of a four-year-old. To this may be added, that after the beast is six or seven-years old, these rings are so irregular in their appearance, and so little to be depended upon, that the age indicated by the two horns is not always the same. We have repeatedly seen a difference of one year, and in some instances we could not make the horns agree by two years at least. Therefore, regarding this as a process of nature, it is far too irregular for any certain dependance to be placed upon it. It is a mere general rule, with far too many exceptions.

There is also a certain instrument called a rasp, the use of which has been said to have made many an arm ache a little before a large cattle fair. What human being can tell whether the ring farthest from the head has, or has not been removed; or whether the second may not have followed the first? If the rasp is fine and gently used, and a little dirt, with or without soot, is rubbed over the part, there is nothing to tell tales, except a rather too great smoothness of the horn thereabouts; and this is said to be obviated by giving the whole of the horn a smooth and polished appearance. We have never liked these pretty, small, smooth, glossy horns. That art had been at work no one could deny; and we were uncharitable enough to suspect that it was oftener employed in the removal of a defect, than the heightening of a beauty. Cattle dealers are not so bad as the horse-merchants; but strange stories have been told of them. We are the less scrupulous in describing this deception, because we shall presently have to speak of a method of judging of the age of cattle, where no roguery can lead us astray.

THE DEGREE OF FEVER ESTIMATED BY THE HORN.

This thinness of the horn at the base will afford us an explanation of the custom of the farrier and the cow leech, when examining a sick beast, to feel, almost first of all, the root of the horn, and the tip of the ear. There is much good sense about this. If the temperature is natural in both, he concludes that there is no great degree of fever; but if the ears are cold, deathy cold, it shows that the blood is no longer circulating through the small vessels, but congesting round some important organ which is the seat of inflammation—and nothing can be more dangerous than this. He also gains from the horn an indication quite as important. We have described the horn at the base as being very thin; it is quite as much so as the cuticle or scarf skin, and it covers one of the most vascular bones in the whole body. No where else can the practitioner get so near to the circulating fluid, or to so great a quantity of it. He, therefore, puts his hand on the root of the horn, assured that he shall there have the precise temperature of the blood, and thus be enabled to judge of the degree of general fever or constitutional disturbance. The horseman puts his fingers into the mouth of the horse for the same purpose; but he cannot judge so accurately, for the vascularity is less, and the covering is thicker.

On the same principles—the thinness of the horn and the vascularity and consequent tenderness of the bone beneath—brutal drovers often aim their blows at the root of the horn. In the cruelties which they inflict, they are restricted by the butchers to the head, to the hocks and below the hocks, because the meat must not be injured; and these being parts with no yielding muscle interposed to break the violence of the blow, but the mere integument covering the bone, and, at the root of the horn, the covering not being a quarter so thick as the general integument, the pain is abundantly more acute than elsewhere. We have already spoken of this when describing the cattle-market of Smithfield.

It is by reason of the extreme tenderness at the root of the horn, that some fool-hardy and brutal fellows have declared that, armed only with a stout bludgeon, they should not fear any bull; for one or two heavy blows on this part would stupify and put to flight the most ferocious beast.

MANUFACTURE OF BEAUTIFUL HORNS.

On this account also it is, joined to the imperfect formation and yielding nature of the bone at an early age, that some miscreants have been said to have acquired the art, by means of heated irons, of giving the horns any direction and form that they please. It has often been hinted that the peculiar turn of many beautiful horns is artificial. How far this practice may be followed now we will not pretend to say; we hope that it is falling into disuse. The great improvement which has been effected in all the breeds of cattle, and particularly the introduction of the short-horns, which have little pretensions to beauty in this part, have directed the attention of gentlemen and agriculturists to far more important objects.

Barrow, in his travels into Southern Africa, tells us that this brutal custom was not confined to Britain or to Europe, and probably had not its origin in either of them; for oxen being used for the saddle as well as draught, by the Naguamas and other tribes, and particularly, being often ridden by ladies, great care was taken to select the handsomest for this purpose; and the horns of the young cattle were twisted into spiral curves and a variety of fantastic forms by means of heated irons.

THE HORNS THE DISTINGUISHING CHARACTER OF THE DIFFERENT BREEDS.

In the preceding chapters, we have classed the different breeds of cattle according to the length of the horn, and we cannot have a better guide. Under the table of the middle-horns, we have ranked all the native horned cattle, the Devons, the Sussex, the Herefords, the Welsh, the Scotch, and some of the Irish. Of the origin of the long-horns we had some doubt; they were either derived from a particular district of Yorkshire, or they were of Irish extraction. The short-horns, now naturalized in every part of England, and becoming as it were *the* British cattle, were confessedly foreigners. In the crosses between them, the horns seem to follow a determined course; as long as the breed remains pure, our cattle may be increased or diminished in size, according to the whim of the breeder or the nature of the soil—they may be changed in the proportions of various parts accordingly as a judicious or injudicious selection has been made for certain purposes—they may be made to assume the character of the true grazing, or of the dairy cattle, but the horn remains the same; it is the distinguishing badge of the breed.

In the present race of short-horns there is a great variety in the form of the horn. Some persons think this of little or no consequence; we confess that we are not of that number. It sometimes tells tales of crosses long gone by or forgotten, and totally unsuspected; and we imagine it to be possible that they will indicate certain peculiarities, excellences or defects, reaching perhaps to no great extent, but yet worthy of notice and record. A treatise on the horns of cattle, and especially on those of the improved breed, might be made a very interesting work; but it would require experience that rarely falls to one man's lot, and an unusual freedom from hypothesis and prejudice.

When speaking of the long-horn cattle, we described some that attained an enormous and most inconvenient length; but they shrink into comparative insignificance, if compared with the oxen of the northern part of central Africa. The Galla oxen, although smaller than the majority of the English cattle, have horns that are nearly four feet in length, and will contain more than ten quarts.

The Burmese oxen, which are much larger, have singular horns of a half-spiral form. Captain Clapperton says that 'the corneous external coat is very soft, distinctly fibrous, and at the base not much thicker than the human nail; the osseous case full of vascular grooves, and the inside very cellular; the pair together scarcely weighing four pounds, yet they are three feet seven inches in length, two feet in circumference at the base, and one foot six inches midway, towards the tip.'

The longest horn, however, is that of the Great Arnee. Captain Williamson speaks of one of the true Arnee buffaloes of Bengal, who pursued a sportsman to his elephant; and which, when killed, was more than six feet in height, three feet wide across the breast, and had horns five feet and a half long. Mr. Bruce gives a singular account of enormous horns occasionally obtained from the Abyssinian cattle. 'The animal furnishing these monstrous horns is a cow or bull, which would be reckoned of a middling size in England. This extraordinary size of its horns proceeds from a disease that the cattle have in these countries, of which they die, and is probably derived from their pasture and climate. When the animal shows symptoms of this disorder, he is set apart in the very best and quietest grazing place, and never driven or molested from that moment. His value lies then in his horns, for his body becomes emaciated and lank in proportion as the horns grow large; at the last period of his life, the weight of his head is so great that he is unable to lift it up, or at least for any space of time. The joints of his neck become callous at last, so that it is not any longer in his power to lift his head. In this situation he dies, with scarcely flesh to cover his bones, and it is then his horns are of the greatest value. I have seen horns that would contain as much as a common sized water-pail, such as they make use of in the houses in England.'*

THE INFLUENCE OF SEX ON THE HORNS.

Of the influence of sex on the horn, we have proof every day; but it is exerted in our domestic cattle in a manner different from all other ruminants. It is the head of the male, and when in his perfect state, that is usually encumbered or adorned with branching honours; the castrated male loses his antlers altogether, or wears a pair of diminutive size, marking his degradation; while the female is generally hornless. On the contrary, our bull is distinguished by a short, straight, comparatively insignificant and ugly horn; while a weaker, but longer, handsomer, and beautifully curved horn adorns the head of the ox; and a still more delicately-shaped one is reserved for the cow.

OCCASIONAL HORNS ON THE GALLOWAYS.

The most singular variety of horn, is that which now and then hangs from the brow of some of our polled cattle. It is no prolongation of the frontal bone; it is not at all attached to that or any other bone of the head; but it grows from the skin, and hangs down on the side of the face. We have already discussed the question whether the polled cattle were one of the original native breeds, or an accidental variety introduced at a very early period. This abortive horn gives much plausibility to the latter notion. There is an occasional attempt at breeding back even at this distant period.

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*Bruce's Travels, vol. vi. p. 50.

THE FRONTALS IN POLLED CATTLE.

The frontal bones hold the same situation in polled cattle. They reach from the nasal bones to the parietal ridge; but as they were not designed to form the base of horns, they materially diminish in breadth towards the poll. The breeders of polled cattle consider this to be a proof of pureness of blood, and of the possession of a disposition to fatten; and we have already said that they are not very wrong in this supposition.

Large cavities between the plates of the frontal bone are found in the polled as well as in the horned breed; but they are not so deep, nor do they extend beyond the frontals. This, however, varies much in the different breeds of cattle.

COMPARISON BETWEEN THE HORNED AND HORNLESS BREEDS.

There was a time when this question was much, and somewhat warmly discussed. It was taken for granted, by those who brought a great deal more theory than practical experience to the consideration of the subject, that the horns were not only useless things, but that they were a serious evil; and one, whose name will ever rank high as a scientific surgeon, has scrupled not to say, that, ‘ on a very moderate calculation, it would be found that the loss in farming stock, and also in the diminution of animal food, is very considerable from the production of horns and their appendages.’ The fact, however, has never yet been thoroughly determined, whether the Galloway, or the Kyloe, with his branching honours, is the most profitable grazing stock; each has its zealous advocates, and each is excellent. But it has been determined, that during the reign of the Bakewellian stock, no cattle displayed such a propensity to fatten as the long-horns; and as the chest became deeper and more circular, and the aptitude to fatten developed itself, the horn lengthened. It has also been determined, that for grazing and milking properties, and particularly for early maturity, no cattle can vie with the short-horns.

The question was most warmly discussed by those who knew nothing about the matter; the existence of horns, or the length of the horn, have in themselves no connexion at all with grazing, or with milking: a beast does not fatten the quicker because there are no horns to consume a portion of the nutriment, nor is he longer in getting into condition because his brows happen to be adorned by them. They are at least ornamental; they cost the breeder nothing; they are useful for various purposes; and they bring so much clear gain to the manufacturer. The hornless cattle may, however, be occasionally packed somewhat closer than the others, and being destitute of the natural weapon of offence, they are less quarrelsome and more docile. But the ferocity of the horned beast is oftener the effect of mismanagement than of natural disposition.

THE USES OF THE HORNS OF CATTLE.

We will conclude this account of the horns of cattle by an extract from Professor Babbage's excellent treatise on Manufactures;—‘ Amongst the causes which tend to the cheap production of any article, may be mentioned the care that is taken to allow no part of the raw produce out of which it is formed to be wasted. An enumeration of the purposes to which the horns of cattle are applicable, furnishes a striking example of this kind of economy. The tanner who has purchased the hides, separates the horns, and sells them to the makers of combs and lanterns. The horn consists of two parts, an outward horny case, and an inward conical-shaped substance, somewhat between hardened hair and bone. The first process consists in separating these two parts, by means of a blow against a block of wood. The horny outside is then cut into three portions, by means of a frame-saw. 1st. The lowest of these, next the root of the horn, after undergoing several processes by which it is rendered flat, is made into combs. 2d. The middle of the horn, after being flattened by heat, and its transparency improved by oil, is split into thin layers, and forms a substitute for glass in lanterns of the commonest kind. 3d. The tip of the horns is used by the makers of knife-handles, and the tops of whips, and for similar purposes. 4th. The interior, or cone of the horn, is boiled down in water. A large quantity of fat rises to the surface, which is put aside, and sold to the makers of yellow soap. 5th. The liquid itself is used as a kind of glue, and it is purchased by the cloth-dresser for stiffening. 6th. The bony substance which remains behind, is ground down, and sold to the farmers for manure. Besides these various purposes to which the different parts of the horn are applied, the chippings which arise in comb-making are sold to the farmer for manure, at about one shilling per bushel, In the first year after they are spread over the soil, they have comparatively little effect, but during the next four or five years their efficiency is considerable. The shavings which form the refuse of the lantern-makers, are of a much thinner texture. A few of them are cut into various figures, and painted and used as toys, for they curl up when placed in the palm of a warm hand; but the greater part of these shavings is sold for manure, which, from their extremely thin and divided form, produces its full effect on the first crop.'

THE OTHER BONES OF THE SKULL.

We shall be very brief in our account of the other bones of the skull, as little of a practical nature is connected with them.

The parietal bone.—We speak advisedly when we call it one bone; for even in the fœtal calf there is no suture. In the horse (vide pp. 66 and 67,) the parietal bone forms the chief part of the roof of the skull. In the ox (*h*, p. 272,) not the smallest portion of it appears on the superior part of the head; but it is found at the back of it, usurping the place of the occipital bone, giving attachment to the muscles of the neck, and particularly to its strong supporting ligament (*m*, p. 272.) It, however, spreads along the side below the horn, giving it some support; and it unites there, as in the horse, with the temporal bone, and contributes to the strength of the part.

The Temporal bones.—These bones (*g*. p. 272 and 273,) have no stress upon them in cattle; they are therefore small, deep in the temporal fossa, and destitute of the squamous suture. The most important difference is the form of the superficial cavity which receives the head of the lower jaw, and which is peculiarly adapted to the lateral grinding motion of rumination.

The Occipital bone.—This bone is, in the ox, deprived of almost all its importance. There is no crest, no tuberosity, and very small condyles, for attachment to the neck; and even its base, although a little widened, is much curtailed in length. It, however, still contains the great foramen through which the spinal marrow escapes from the skull (*i*, p. 272, and *d* and *l*, p. 273.) There are two foramina for the passage of nerves.

The Sphenoid and *Ethmoid bones* are in the same relative situation. The pterigoid processes of the former are much larger than in the horse (*o*, p. 273.) In the ethmoid bone (*r*, p. 273,) there is no such material or practical difference.

THE BRAIN.

All these bones unite to form the cranial cavity, and in which the brain is contained. It is surrounded by the same membranes; but, comparing the bulk of the two animals, the brain of the ox is not more than one-half the size of that of the horse. The medullary substance which forms the roots of the nerves is as large, and some of the nerves, and particularly the olfactory nerve, or that of smell, are as much developed; the deficiency is in the cineritious part—that part which we ventured to consider as connected with the intellectual principle. The medullary substance is that by which impressions made by surrounding objects are conveyed to the brain, and received there, and the volitions of the mind transmitted, and motion given to every part: the cineritious is that portion where the impressions are received, and registered, and pondered upon, and made the means of intellectual improvement, and from which the mandates of the will proceed. Now the senses of the ox are as acute as those of the horse; he sees as clearly, hears as quickly, and has the sense of smelling in greater perfection; but he has not half the sagacity. He partly has it not, because he does not receive the education of the horse; but more, because nature, by diminishing the bulk of the intellectual portion of the brain, has deprived him of the power of much improvement. Yet the difference is in degree, and not in kind. We have endeavoured to prove, in the second chapter of this work, that he possesses sufficient intellect to qualify him for the situation in which nature has placed him, and to enable him to render us all the service that we can justly require of him. We ventured to go farther than that, and to show that when education lent her aid, and too wide a field was not opened, the ox would display sagacity and docility for which the common observer would not give him credit. Shall we somewhat enliven a dry part of our work by adding one or two additional anecdotes to those already related?

THE INTELLIGENCE OF OXEN.

First—maternal affection, mixed with a process of reasoning:—A person was walking through a field, when a cow ran towards him, lowing most piteously. For a moment he was alarmed, and the suspicion of madness occurred to him; but when she came near to him, she turned, and went back the way she had come, looking earnestly at him and lowing. He wondered, but passed on. Again she came close to him, gazed anxiously at him, and then lowing, trotted away in the same direction. His curiosity was now roused, and he followed her. She led him to the farther end of the field, where her calf had fallen into the ditch, and was nearly drowned. He rescued the little animal, and the mother expressed her joy in many an awkward but expressive gambol.

Next—attachment to their keepers:—'Two *biparies*, or carriers of grain and merchandise on the backs of buffaloes, were driving a loaded string of these animals from Palamow to Chittrah. When they were come within a few miles of the latter place, a tiger seized upon the man in the rear, which was seen by a *guallah* (herdsman,) who was watching a herd of buffaloes grazing. He boldly ran to the man's assistance, and cut the tiger very severely with his sword, who immediately dropped the biparie and seized the herdsman. His buffaloes observing it, attacked the tiger, and rescued the herdsman; and they tossed the tiger about from one to the other until they killed him. Their aid was, however, ineffectual; for, although the biparie recovered, the herdsman died.'

Every farm-yard has anecdotes of the attachment of cattle to particular persons, and the power which they have over them. A cow has often retained her milk day after day until her udder has been distended to the utmost, and would suffer no one to approach and milk her, until her favourite dairy-maid returned. In the establishment of Mr. Bakewell, we do not know that there were illustrations of this strength of attachment, or of extraordinary sagacity, but there were numerous ones of the most perfect docility.

One anecdote more, illustrative of the reasoning faculty in these animals. A gentleman near Laggan, in Scotland, had a bull which grazed with the cows in the open meadows. As fences are scarcely known in that part, a boy was kept to watch lest the cattle should trespass on the neighbouring fields and destroy the corn. The boy was fat and drowsy, and was often found asleep; he was of course chastised whenever the cattle trespassed. Warned by this, he kept a long switch, and revenged himself upon them with an unsparing hand, if they exceeded their boundary.

The bull seemed to have observed with concern the consequence of their transgression; and, as he had no horns, he used to strike the cows with his hard forehead, and thus punish them severely if any one crossed the boundary. In the mean time he set them a good example himself, never once entering upon the forbidden grounds, and placing himself before the cows in a threatening attitude if they approached it. At length, his honesty and vigilance became so obvious, that the boy was employed in weeding and other business, without fear of their misbehaviour in his absence.

We will not push the argument too far. The ox has but one-half the bulk of brain of the horse, and not more than one-half of his intelligence; and we shall see in another part of our series, that the horse has not one-half of the comparative bulk of brain of the dog, and certainly not one-half of his sagacity and fidelity: therefore the dog is our companion and friend, as much as our servant; the horse is employed in some of the upper and more important departments of our service; while the ox occupies an inferior rank—but he, nevertheless, is our servant, and has sufficient capacity to perform the duties we require of him. The difference between him and the rest—the difference that pervades all nature—is in degree, and not in kind. He is, therefore, not so despicable as many imagine him to be, and he deserves better treatment than he sometimes receives. Except in some districts, where he is used for the plough and on the road, and where he displays stoutness and docility equal to any horse, (it is true, indeed, that no great degree of intellectual power is required for this,) we have degraded him to a state in which he has little concern with any thing beside his food, and the reproduction of the species. In a country like ours, and with better servants at our command, that is the situation which he ought to occupy, but if it were needed, he has intellectual power far superior to this; he occasionally displays the germ of every social affection; and the knowledge of this should give us a kindlier feeling towards him, and protect him from many an abuse.

PECULIARITIES OF THE BRAIN OF THE OX.

Of the peculiarities of the brain of the ox we will say little, for they are unconnected with that which is the main object of our treatise, the 'useful knowledge' of the animal; but as the posterior part of the brain, under the cerebellum, or little brain, and at the commencement of the spinal chord, (see p. 68, 'Horse,') is a condensation of medullary matter, (the *medulla oblongata*,) whence proceed the nerves that are connected with the involuntary motions of life, and by which the heart beats, and the lungs play, and the intestines propel the food. In the horse it is nearly double the proportionate size of the same part in the human being, because the heart will often have to propel, and the lungs to purify, a greater quantity of blood, in order to enable that animal to support a degree of exertion rarely required from the human being. In cattle this part is, in proportion to the size of the animal, of yet greater bulk, for he has to contribute to the food of man, while living and when dead; and the heart must strongly beat, and the stomach and the intestines must be constantly and actively at work, in order to furnish the requisite quantity of milk when living, and the expected abundance of flesh and fat when consigned to slaughter.

The ox, however, is, in a manner, exempt from labour. Even in the districts of our own country, in which he is employed on the farm or the road, his work, although not always light, is slow, and is nothing compared with that of the horse. At the termination of this *medulla oblongata*, (*q*, p. 68, 'Horse,') commences the spinal chord, whence proceed all the nerves connected with the voluntary motions of the body. Now although the *medulla oblongata* is proportionally larger in the ox than in the horse, for the reason we have just stated, the spinal chord is considerably smaller, because so much muscular power is not needed. To the comparative anatomist, this is a most valuable proof how admirably each animal is adapted to his situation and destiny; and these comparisons cannot be devoid of interest to any one who has been accustomed to the observation and study of the works of nature.

THE EAR.

Two of the senses, hearing and sight, have their residence in the head: of them, therefore, we shall next speak.

In horned cattle, where the ears are often comparatively small, and, on account of their situation, limited in their motions, and can be seldom erect, they are little regarded. The bull has usually the shorter horn and the larger ear; and in some breeds, and particularly the Kyloe, and the Kyloe bull more especially, it has much to do with the beauty of the head.

In polled cattle, the ear of a fair size but not too large, freely moveable and well fringed, corresponds with the beautifully curled forehead, and is considered to be a point of some importance. The portrait of Mr. Watson's Angus cow (p. 169,) will illustrate our meaning; while the snake-head and large ears of the Suffolk cow, (p. 176,) and even in a horned beast, the disproportionate length of the ears in the Ayrshire cow, (p. 128,) will show how much they can diminish the beauty of the animal. In the Ayrshire bull, however, (p. 129,) the ears are a great addition to his noble countenance. A large ear would be generally objected to, as indicating coarseness of form, and possibly of flesh. The only advantage of a large ear would be, that it might be better able to discharge one of its functions, and rather an unexpected one, to guard the eyes from injury. A person cannot long observe an ox, without admiring the adroit use he makes of the approach of danger from every quarter. He is oftener the pursued than the pursuer, and therefore requires a lateral, instead of a somewhat forward direction of the eyes. The eyes are prominent, in order to increase the field of vision, and they are rendered thus prominent by the mass of fat which is accumulated at the back of them. A prominent eye is reckoned a good point in a beast; it shows the magnitude of this mass of fat, and therefore the probability of fat being accumulated elsewhere. This prominence, however, should not be accompanied by a ferocious or unquiet look; for breeders have agreed that neither the grazing nor the milking beast can have too placid a countenance, or be too quiet and docile in her habits.

THE EYELIDS AND THEIR DISEASES.

The eye is supported and covered by the lids, which were designed to answer the same purpose as in the horse, viz., to close at the approach of danger, and so afford considerable protection to the eye; to supply it with that moisture which is necessary to preserve its transparency; to defend it from the light when diseased; and to droop over it, and permit the animal to enjoy the repose which nature requires. At the edge of each of the lids is a cartilage, to preserve their form, and to enable them to close accurately; and along these edges are numerous little openings, which pour out an unctuous fluid that defends them from the acrimony of the tears.

Cattle are very subject to a pustular eruption on the edges of the eyelids, accompanied sometimes by great soreness, and considerable ulceration. It bids defiance to every application, except the mild nitrated ointment of mercury, and occasionally it does not yield even to that; yet on the approach of winter, it frequently disappears spontaneously. It indicates a foul habit of body, and is often connected with mange; and unless proper means are taken, it will assuredly return in the following spring. Purges of sulphur will be found useful: but if the animal is so fond of a mash, as not to refuse one with a powder in it, a course of alterative medicine will be most serviceable. The powder should consist of one part of Æthiop's mineral, two of nitre, and four of sulphur; and should be given in doses of from half an ounce to an ounce every night, according to the age and size of the beast.

Warts on the eyelids are best removed by the scissors—the root being afterwards touched with the nitrate of silver.

The ox has the same contrivance as the horse for cleansing the eye from annoying substances. A flat piece of cartilage, of a semicircular form, is placed within the corner of the eye. No muscular apparatus is attached to it; but when its use is required, the eye is drawn back by the retractor muscle, and the mass of fat at the inner side of the eye is forced forward, and drives the haw before it over the eye. When the retractor ceases to act, the fatty substance returns to its place, and again draws back the haw within the corner of the eye.

This part of the eye is more disposed to disease in the ox than in the horse. The little portion of fleshy substance towards the inner edge of the cartilage, and the caruncle, or small fleshy body, placed at the corner of the eye to give a proper direction to the tears, take on inflammation from sympathy with the eye generally, or from some injury done to themselves, or from the irritation of dust or gravel; they swell prodigiously, and the haw is protuded over the eye, and cannot return. Ulceration soon begins to appear, and a fungous growth springs up. Sometimes this seems to be as a kind of epizootic. I have seen more than a dozen steers on one farm with the caruncle on the bulb of the haw thus protruded, ulcerated, and much enlarged, in consequence of a fungous growth on it; and there has sometimes been caries of the cartilage. Every means should be adopted to save this part, for the removal of it will inconvenience and torment the animal as long as he lives.

If the disease is connected with inflammation of the eye generally, all will subside with that inflammation, and this may be hastened by the application of a Goulard wash, or diluted tincture of opium. If it appears to be a disease originally of the part itself, the zinc lotion must be diligently used, (two grains of white vitriol dissolved in an ounce of water, and the vitriol gradually increased to four grains; the application of it confined as much as possible to the part, and the liquid not being suffered to get to the sound part of the eye.) A perseverance in the use of the zinc wash will often do wonders. When it seems to lose its power, a lotion of corrosive sublimate may be adopted, first of the strength of half a grain to an ounce of water, and gradually increased to two grains.

If, after all, it becomes necessary to extirpate the part, the beast must be cast; an assistant must keep open the eye with his fingers; a crooked needle, armed with strong silk, must be passed through the cartilage, by means of which the part may be drawn out as far as possible; and then, with a pair of crooked scissors, the haw may be neatly dissected out. If the ulceration has extended to any of the parts behind, or to the neighbouring tissues, they also must be removed. Considerable bleeding will probably follow the operation, and some inflammation of the neighbouring parts; but they must be subdued by proper means. If fungus should sprout, it must be touched with the caustic; but there is little danger attending the operation.

The eyelids are more subject to disease in the ox than in any other domestic animal. If any foreign body gets into the eye, and remains long there, the eyelids never fail to partake of the irritation; they become hot and tender, and very much thickened. Sometimes the eyelid will continue thickened after the inflammation of the eye has subsided. Fomentations will be indicated here. Occasionally there is œdematous swelling of the eyelid, and especially where the pasture is damp and marshy. These enlargements are too little thought of, and left to nature to relieve; but they indicate a certain degree of general debility, and a disposition in the eyes to take on disease. We have seen many old cattle whose eyelids were either distended with fluid infiltrated into the cellular texture, or from which a portion of the fluid had been removed by absorption, but a deposit remained, indicated by the impression of the finger being left upon the lid. These cattle were always more or less out of condition, or would not fatten kindly, or had lately had inflammation of the eyes, or were attacked by it soon afterwards.

A curious appearance—we can scarcely call it a disease—has been observed in the eyelids of fat bullocks. They have been emphysematous. A certain portion of gas has been infiltrated into the cellular tissue. It is said that in France this has, now and then, been the consequence of the rogueries of cattle-dealers. When there have been too many hollows, or salient points, about the cattle, a perforation has been made through the skin, a little pipe introduced, and a quantum suff. of air blown into the cellular substance, a portion of which, by degrees, found its way into the eyelids. We do not believe that tricks like these are attempted here; although we shall have to expose not a few of the dishonest and brutal practices of cattle-dealers. If this natural emphysema is supposed to be a dissight, a slight scarification may be made on the lid, and the gas gradually pressed out.

the approach of danger from every quarter. He is oftener the pursued than the pursuer, and therefore requires a lateral, instead of a somewhat forward direction of the eyes. The eyes are prominent, in order to increase the field of vision, and they are rendered thus prominent by the mass of fat which is accumulated at the back of them. A prominent eye is reckoned a good point in a beast; it shows the magnitude of this mass of fat, and therefore the probability of fat being accumulated elsewhere. This prominence, however, should not be accompanied by a ferocious or unquiet look; for breeders have agreed that neither the grazing nor the milking beast can have too placid a countenance, or be too quiet and docile in her habits.

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The eye of the ox generally is larger and flatter than that of the horse, but the transparent cornea is more convex. The pupil is of a transverse oblong form; and the iris is dark, but somewhat varying with the colour of the animal. The inner construction is the same as that of the horse, and the diseases have too much affinity.

It is on account of the cornea of the ox being so convex, and the lens also more than usually convex, that many cattle appear to be short-sighted, at least while they are young. Every one accustomed to cattle must have observed how close the herd generally, and the steers and heifers particularly, will approach to a stranger, before they appear to have made a satisfactory examination of him.

OPHTHALMIA.

Ophthalmia is as frequent in the ox as in the horse. When it can be removed, it is by the same means as in the horse, and in other cases it is equally obstinate. It has the same periodical character, and will disappear and return until it has its natural termination—blindness. The cases of simple ophthalmia, however, proceeding from the introduction of foreign bodies into the eyes, blows, or being the accompaniment of other diseases, and then yielding to medical treatment, are more numerous in the ox than in the horse, and therefore, as it is not always possible in the early stage to distinguish the one from the other, the disease may be attacked with more confidence.

The means of cure are the same, bleeding and physic, as the constitutional treatment; and fomentations, cold lotions—opium, in the form of the vinous, or the dilute spirituous tincture—saturnine lotions—zinc lotions, as local applications; the opium during the acute stage, the lead resorted to as soon as the inflammation begins to subside, and the zinc as a tonic, when the inflammation is nearly subdued. The chief difference in the mode of treatment is the necessity of having recourse to the tonic lotion somewhat sooner for the ox than would be deemed prudent for the horse. The increased strength of the vascular system in the ox will account for this: inflammatory diseases speedily run their course in these animals; and debility, whether general or local, treads closely on the heels of undue action.

The periodical nature of the disease being once apparent, the proprietor should be immediately informed of the state of the case, that he may at once send the animal to the butcher, or hasten to prepare it for sale; and there is one fact that cannot be too deeply impressed on the mind of the breeder, that ophthalmia is as certainly hereditary in cattle as it is in the horse.

OTHER DISEASES OF THE EYE.

There is a singular disease of the eye, which cannot properly be called ophthalmia, that is sometimes epizootic among cattle, and sadly frightens the owner when it first appears. Young cattle pasturing on wet and woody ground are suddenly seized with swellings of the tongue and throat, and eruptions about the membrane of the mouth. At the same time the eyes become intensely inflamed, and superficial ulcers appear on the cornea. The cow-leach is sent for in haste, and he, thinking that desperate cases require desperate remedies, applies his caustic or his astringent lotions. He adds fuel to fire, the inflammation grows more intense, and several of the cattle become blind. A little experience would have taught him that this was only one of nature's methods, a rather singular one indeed, of getting rid of something that offended the constitution; and that his wisest way would be to let her pretty nearly alone. The skilful practitioner foments with warm water, or, if the eyes are closed, perhaps he applies an evaporating lotion of cold water, with a little spirit, and possibly he gives gentle physic; and he soon has the satisfaction to see the inflammation disappearing, and the ulcers gradually healing, the process of which he somewhat hastens by a very weak zinc wash.

The ox is subject to Cataract, but it is not often seen, because periodical ophthalmia is not so frequent in him as in the horse; and as soon as the existence of that disease is ascertained, the animal is prepared for slaughter; yet there are few herds in which there is not found a beast with cararact in one eye.

Gutta serena, or palsy of the optic nerve—blindness in one or both eyes, yet the perfect transparency of the eye preserved—is a disease of rare occurrence among cattle, and partly for a similar reason, that it is no sooner recognised than the beast is destroyed. A blind horse may be useful for many purposes, a blind ox is good for nothing.

Cancer of the eye, or a perfect change of the mechanism of the eye into a fleshy, half-decomposed substance that ulcerates and wastes away, or from which fungous growths spring that can never be checked, is a disease of occasional occurrence. The remedy would be extirpation of the eye, if it were deemed worth while to attempt it.

A very curious disease of the eye has, in a few instances, been observed. The common symptoms of ophthalmia appear, as injection of the conjunctiva, dimness of the cornea, weeping, and swelling of the lids. These are properly attended to, but the inflammation increases; and, on very close examination, a small white worm, about the size of a hair, and an inch in length, is found swimming in the aqueous humour, or that fluid which is immediately behind the cornea. Now it is at once evident that the only way to get rid of, or to destroy this worm, is to puncture the cornea, and let it out; and this method has been resorted to. In some cases, however, not many days pass before another worm makes its appearance, and the operation is to be performed a second time, and the horse eventually loses that eye. A veterinary surgeon, Mr. Chaignaud, who seems to have had most experience about this, says, that three or four days before the appearance of the worms, one or two minute bodies, of a reddish-white colour, are seen at the bottom of the anterior chamber of the eye. He also says that the disease appears about June, and is not seen after December. We confess that the malady has not fallen under our observation; but in a work on British cattle, every disease, of which there is authentic record, should be described. There is no difficulty about these animalcules getting into the eye, for there are undisputed instances of their passing through the smallest capillaries, and being found in almost every tissue.

FRACTURE OF THE SKULL.

One class of the diseases of the head to which cattle are exposed will fall under the title of compression of, or pressure upon, the brain. Although it is a curious fact, that portions of the external or cineritious part of the brain may be cut away without the animal being conscious of it, yet the slighest pressure cannot be made upon the brain without impairment of consciousness, or loss of the power of voluntary motion. A curious illustration of this occurred to a veterinary surgeon. Notwithstanding the protection which the divided plates of the frontal bones, together with the interposed elastic bony walls afford, the horn of a vicious beast will sometimes do mischief. It had penetrated both plates in the head of a cow, but she was seen grazing as usual, with a greasy bloody fluid running from the nostril. The finger was incautiously introduced to ascertain the depth of the wound, when the cow fell as by a stroke of lightning; but after lying two or three seconds insensible, she got up and began to graze again. She fed and ruminated for two days, and then, on being taken out to the water, she had no sooner quitted the stable than she began to turn slowly round and round from the left to the right. She was stopped, and led a little further on, when she commenced the same rotatory motion and in the same direction. She was immediately destroyed; the horn had penetrated deep into the brain, and almost to the base of it.

The very construction of the skull of the ox, which gives a degree of security from ordinary danger, deprives us of a valuable means of relief, in case of compression of the brain from fracture. In the human being, and in some situations in the horse, a hole may be made with a trephine at a little distance from the depressed portion of the bone, and then a slightly curved unyielding piece of iron introduced, which, acting on the principle of the lever, raises the depressed bone to its proper situation. This double plate of the frontal, and the distance interposed between the two plates, renders it impossible to use such an instrument with success on the ox, and therefore the animal should always be consigned to slaughter.

ON HYDATIDS AND TUMOURS IN TME BRAIN.

The sheep is subject to a disease strangely termed TURNSICK, in which the animal goes round and round in the same way as the cow with the fractured skull. The cause of this peculiar motion has been satisfactorily traced to an animalcule, called an hydatid, pressing upon the brain, and many strange operations have been had recourse to, in order to remove or destroy the parasite.

The cow will sometimes exhibit the same symptoms. First, some degree of fever comes on—she perhaps scarcely eats—rumination is suspended—the muzzle is dry—the ears and roots of the horns hot—the breathing laborious, and the hair rough. It is fever without any evident local determination. Perhaps she is bled and physicked; but on the following day, the thing begins to speak for itself; she turns round and round, and always in the same direction: it is pressure upon the brain; and, remembering what he sees in his sheep, the farmer at once despairs, for it is plain enough that no operation can relieve such an animal from the hydatid.

Let him not, however, despair. It is evidently pressure on the brain; but is the pressure of the hydatid the only one that can affect the brain, or produce this peculiar motion? Would not effusion of blood, or of any fluid, on some circumscribed portion of the brain, produce the same effect? There may have been a somewhat too great determination of blood to the head, and some little vessel may have given way. It is worth trying for a day or two at least, and the cow will not be much the worse for slaughter in that time. She should be bled again, and that copiously; and a stronger dose of physic should be given. In some instances, perhaps we may be justified in saying in the majority of cases, the animal will do well. A somewhat spare diet at the time, and for a while afterwards, will be plainly indicated. Success will not, however, attend every case, and in some countries, much oftener than in Great Britain, cattle have hydatids on the brain.

It is a disease, however, peculiar to young cattle. It seldom attacks any beast after he is a year and a half old. Bartholin, an old writer, states that, in 1661, a great many beasts perished from a species of phrensy, and that when they were examined, vesicular worms were found in the brain. In Switzerland, attacks of the hydatid are said not to be unfrequent among cattle; and as soon as the beasts begin their circular walk, they are caught and struck somewhat hardly on the head, and between the horns, with a hammer, and the operator judges of the situation of the hydatid by the shrinking of the animal, and the hollowness of the sound.

Now, we apprehend that enough has been said of the hollow between the plates of the frontals, and occasional inflammation of the lining membrane, and collections of pus about the roots of the horns, to satisfy the reader with regard to the real nature of this supposed hydatid. The shrinking will point out the spot at which the membrane is inflamed; and the *suspension* of the hollow sound will indicate where the pus is collected. There the operator makes an opening into the skull, and a fluid escapes, which he conceives to be the contents of the hydatid.

Veterinary writers, in those countries where the hydatid in cattle is known, very properly remark that it may be discovered in young stock in the same manner that it is in sheep, by the softening of the bone at a particular part; because the frontal sinuses are not fully developed in young beasts. The hydatid may then be punctuated with an awl in the common way, or better got at with the trephine; but for our own parts the chance of *permanent* cure is so slight in *sheep*, that we should be inclined to recommend that the *young cattle* thus affected should be immediately destroyed.

WATER IN THE HEAD.

There is another species of pressure on the brain, to which young an very young cattle are confessedly subject, and that sometimes even in the fœtal state, we mean HYDROCEPHALUS, or water in the head. The fluid is usually found between the membranes, and it exists in so great a quantity, and enlarges the cranium to such a degree, that parturition is rendered difficult and dangerous; and it is often necessary to destroy the progeny in order to save the life of the mother. There should be no hesitation about this, for a calf with water in the head will never be good for any thing.

A calf was born with a large tumour on the frontal bone—it was weak —it staggered as it walked—it was unable to raise its head to seize the teat, but it sucked heartily when it was held to the teat, and the head supported. The tumour was punctured on the third day, and two pints and a half of fluid escaped. The calf then walked of its own accord to the mother, held up its head for the first time, and sucked its fill. For three days it seemed to be going on well—when a bloody pus began to flow from the wound—the animal refused to suck—tetanus supervened, and the calf died.

We have sometimes, yet not often, seen hydrocephalus appear after birth in very weakly calves; but we do not recollect an instance in an healthy one; and in almost every case it has been fatal: therefore as indicating weakness, and rapidly undermining the powers of the constitution, prudence would immediately consign such an animal to death.

In the adult animal, the pressure of a serous fluid on the brain will occasionally be a source of general disease, or death; but it will then be an accumulation of fluid in the ventricles of the brain, rather than between the membranes, and not indicated by any change in the size or form of the skull. The symptoms will very much resemble those of apoplexy, which we are presently to describe, except that they are of a milder character, and the malady is slower in its progress—and the plexus choroides, or network of minute arteries and veins in the ventricles, are usually con siderably enlarged.

APOPLEXY.

Cattle are very subject to sudden determination of blood to the head. They are naturally plethoric; they are continually under the influence of a stimulating and forcing system; and that without the exercise by means of which the injurious effects of that system might in a great measure be counteracted. The food of the horse is regulated by this consideration, that while he obtains muscular power equal to the work that we require from him, there shall be no useless accumulation of fat to impede him in that work; whereas the very object in our management of the ox, is to clothe him with as much flesh and fat as possible; therefore it is that he is so subject to all the diseases connected with a redundancy of blood, and to apoplexy among the rest.

There are few premonitory symptoms in these cases. The animal is struck all at once. The disease is called in many parts of the country *blood-striking*. Had the beast been closely observed, it might have been perceived that he was more than usually indisposed to move—that the breathing was a little laborious, and the eye somewhat protruded; but the herdsman takes no notice of trifles like these. *The animal seems to be struck all at once*—he falls—he breathes heavily and stertorously—he struggles with greater or less violence, and then dies—sometimes in five minutes—oftener after the expiration of a few hours.

If there is time to do any thing, the beast should be bled, and as much blood should be taken away as can be got. A pound and a half of Epsom salts should next be given, and without any carminative; and this followed up with doses of half a pound until the physic operates; its action should afterwards be maintained by six-ounce doses of sulphur every morning.

The congestion of blood in the vessels of the brain being removed, and also the congestion which, to a certain degree, prevails every where, the beast should be slaughtered; for he is liable to a return of the complaint from causes which would not, previous to his first attack, have in the slightest degree affected him.

PHRENITIS.

The PHRENSY OR SOUGH in cattle is too well known to the farmer and the practitioner. There is generally, at first, much oppression and heaviness; the animal can scarcely be induced to move; the eyes are protruded and are red; the respiration is hurried; and delirium, more or less intense, rapidly succeeds. The beast rushes at every thing in its way; it mischievously seeks out objects; it is in incessant action, galloping about with its tail arched, staggering, falling, bellowing hideously; its skin sticking to its ribs, and the sensibility of the spine strangely increased. There is even in health a peculiar formation of the eye of the ox, or a sensibility of the retina to certain colours, which makes the beast dislike a brilliant red object;* under this disease it raises him to the highest pitch of fury.

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* The following anecdote, related by Sir Walter Scott, will illustrate this antipathy to red which cattle sometimes exhibit, and at the same time give the reader some idea of the conversational peculiarities and powers possessed by that great man. The story was told by him a year or two before his death.

'Talking of a mischievous bull puts me in mind of a similar case, which I myself witnessed many years ago in Edinburgh. I was proceeding from the old to the new town, by the earthen mound, at the head of which I was led for a few minutes to look at a bull that had got into an inclosure there, after the unmerciful butcher-lads had driven it fairly mad. The crowd that gathered on the outside of the fence increased the brute's fierceness. At last they began to cast ropes over its horns and around its neck, thereby to pull it to a strong hold, that it might be slain in the place where it was, which drove it to its most desperate fury. Its eyes now glared madness; there were handfuls of foam

As, however, the previous oppression and stupidity were much less in the ox than in the horse, so is the succeeding violence increased; not even a rabid ox is a more fearful animal, and it is somewhat more difficult to distinguish between these two diseases in the ox than in the horse. In the early stage of phrenitis, although there may be lowness or oppression, there is nothing like apoplexy, or want of consciousness. Besides, with all his fury, there is more method in the madness of the rabid than the phrenitic ox. The latter will run at every thing which presents itself, but it is a sudden impulse; the former will, as it were, plot mischief, and will endeavour to lure his victims within his reach. A much greater quantity of foam will also be discharged from the mouth of the rabid than the phrenitic ox.

The causes are much the same as those of apoplexy, too stimulating food, and too great redundancy of blood; to which may generally be added some immediately exciting cause, as hard and rapid work in sultry weather, over-driving, &c. In the neighbourhood of London, too many instances of phrenitis occur from the latter cause. It once used to be the sport of brutes in human shape to excite it, by selecting a beast from the herd, and driving it furiously from street to street.

As to the treatment of phrenitis there is some difficulty. Is any treatment practicable? Is human life to be hazarded? Cases will occur in which a bullet would be the best remedy; but then the flesh will be in such a congested state that it cannot be sold. If the beast can be managed or approached during a momentary remission of the symptoms, bleeding should be attempted, and if a vein can be opened, it should be suffered to bleed on as long as it will. Physic, if it can be given, will be indicated. Sometimes the beast labours under an insatiable thirst, and as his taste is not now very exquisite, he may be cheated with water in which Epsom salts have been dissolved. If there is time to get down one hornful of drink, a scruple or half a drachm of the farina of the Croton nut may be administered, mixed with a little gruel. All other medicines are completely out of the question. If bleeding and physic will not save the ox, nothing will. Use should also be made of any temporary respite to confine the animal; or, if possible, to get him into some place

flying from its mouth: with its fore feet it pawed the ground, throwing lumps of earth as high as the adjoining houses, and it bellowed so as to make one quake. It was any thing but an agreeable sight, so I moved away homewards. But before I got to the foot of the mound, an alarming shout caused me to look back, when I perceived the animal at no great distance behind me, coming on with all its rage. I had just time to spring to the top of the wall that lined the footpath, and to behold its future progress.

'I shudder to this hour when I think of what immediately I saw. Among the people that were near me and in jeopardy, was a young lady, and, as you have said, she wore a red mantle, which is a very offensive colour to many of the brute creation. As I did, she also made for the wall, but had neither time nor strength to gain its top ere the infuriated animal drove towards her. She turned her back, however, to the inaccessible eminence, as if to see the full extent of her fate, and then stood as nailed to it, save only her arms, which she threw aloft in her despair, which would have been as fragile in defence as a rotten reed. Her tender body would have been nothing against a force that could have broken bars of brass, and horns that might have transfixed an animal of its own size. As I have said, directly towards the unprotected young lady the bull drove forward: with intentest eye he came on, he mistook his mark not an inch; for as the multitude behind him yelled their horror, he dashed with prodigious strength and madness against her.

'Was it not a miracle that the dear young woman escaped unhurt and untouched? Yet, it was true; for the terrific animal struck at her so accurately, that a horn smote the dead wall on either hand, thus embracing, but from their great length shielding, her person from even the slightest danger. But the staunch wall withstood the tremendous thrust, and sent back with rebounding force, to a great distance, the huge and terrible brute, throwing him prostrate, never to rise again; for numberless destructive weapons were plunged into him, ere he had time to recover from the recoil.

where he cannot do much harm to himself or to any one else. Some persons have recommended setons of black hellebore root, inserted in the dewlap, and when these begin to act, they generally do so to some effectual purpose; but the animal will usually have recovered, or be dead, before the seton begins to discharge.

The phrensy having been subdued, the next consideration is, what is to be done with the beast. No more dependence can be placed on him than on the one that had recovered from a fit of apoplexy. The purging system should be continued to a moderate degree, and the fever medicine should be given to abate the quickness of the circulation; and then, when the congested blood is got pretty well out of the system, and the flesh begins to look well, and has become healthy, the sooner he is disposed of the better.

TETANUS, OR LOCKED JAW.

The nerves proceeding from the spinal chord are of two kinds, those by which the power of voluntary motion is conveyed to the limbs, and those by which the impression of surrounding objects are conveyed to the mind. We will treat first of the diseases of the nerves of motion. There is a fluid or influence conveyed from the brain, through the medium of the spinal chord, to the various parts of the body, and by means of which those parts are moved. In a state of health, that influence is communicated in a uniform succession of undulations, or pulses. In disease, it may rush on violently and without interruption; if that is only partial and has relation to a single muscle, or one set of muscles, the animal is said to be cramped; if this violent and uninterrupted action extends over the frame, he labours under tetanus; if the stream of influence is rapid and strong, but there are suspensions, he has fits; and if the nervous influence is altogether withheld, there is palsy.

TETANUS is not of frequent occurrence in cattle, but it is seldom that a beast recovers from it. Its approach is very insidious, and rarely observed by the herdsman until the mischief is done. The animal is off its food, ceases to ruminate, is disinclined to move, and stands with its head protruded, but there is no dryness of the muzzle, or heat of the horn, or coldness of the ears; and nothing is done. The next day the beast is found in the same state; it has scarcely moved, and the herdsman begins to be a little alarmed and mentions the case to the owner. The animal is now standing straddling behind, he can scarcely be induced to alter his position, and, if he is made to turn, he turns all together. The finger is put into the mouth, and it is found that the jaw is locked; a discovery which might have been made two or three days before, and when the ox might have been saved.

Working cattle are most subject to tetanus, because they may be pricked in shoeing; and because, after a hard day's work, and covered with perspiration, they are sometimes turned out to graze during a cold and wet night. Overdriving is not an uncommon cause of tetanus in cattle. The drovers, from long experience, calculate the average mortality among a herd of cattle in their journey from the north to the southern markets; and at the head of the list of diseases, and with the greatest number of victims, stands 'locked jaw,' especially if the principal drover is long absent from his charge.

The treatment of such a disease must be of the promptest character. The animal should be bled until the pulse falters, or rather until the patient blows, staggers, and threatens to fall. There is nothing so likely to relax spasm of every kind, and to have some effect even in this excessive and universal one, as bleeding almost to fainting. We have known twenty, and even twenty-four pounds, taken from the beast before the desired effect was produced, and these are the cases which oftenest do well, when the constitution resists the bleeding as long as it can, and then gives way.

One effect, not always so lasting as we could wish, follows the bleeding; the spasm is somewhat relaxed, and the jaws can be opened a little way. Advantage must be immediately taken of this to pour in a dose of physic. That which is most active, and lies in the smallest compass, is the best here; and half a drachm, or two scruples of the farina of the Croton nut should be given in a little gruel with, if it can be then administered, or as soon as it can, a pound or a pound and a half of Epsom salts in solution. This must be followed up until the bowels are well opened. All other medicine, all other means, will be thrown away until brisk purging is produced.

There is sometimes a great deal of difficulty in this. We shall have occasion to show hereafter that the direction which a fluid takes, or the stomach into which it goes, is uncertain. It may pass on at once through the third and fourth stomachs, and produce its effects on the bowels; or it may accumulate in the paunch, without producing any effect whatever. The manner in which it is given may have some influence here. If the attendant is in a great hurry to take advantage of the relaxation of the spasm, and pours down the whole drink as quickly as he can, and as it were in one body, it is very likely to find its way into the paunch. If he goes quietly to work, and gives a little at a time, or suffers it to run gently down the throat, it will probably flow into the fourth stomach and the intestinal canal. The explanation of this will be given in its proper place.

The bowels must be opened. After the first dose of Epsom salts and Croton farina, half-pound doses of the salts should be given every six hours until the desired effect is produced; but the first day having passed, the Epsom salts may be changed with advantage for common salt. Injections should likewise be administered every third hour, and in sufficient quantity, (four or six quarts at least,) and in each of them half a pound of Epsom salts should be dissolved. If four or six doses of medicine have been given, and the animal continues to be constipated, the pulse, the ear, and the horn, should be examined as to the degree of fever; and if any degree of it is indicated, or if the pulse does not plainly denote debility, a second bleeding must be resorted to, and carried on as before until the circulation is evidently affected.

If the animal still remains constipated, it is clear enough that the physic is accumulated in the paunch; and that that stomach is not disposed to act. Strong doses of aromatics and tonics must now be added to the physic, in order to rouse the paunch, if possible, to the expulsion of its contents, and should that fail, recourse must be had to the assistance of the stomach pump. The œsophagus-tube must be introduced into the gullet, and carried down into the rumen, and warm water must be pumped in until that stomach is filled and overflows; and then the contents will either be returned by vomiting, or pass through the third into the fourth stomach, and so into the intestines, and the wished-for purgative effect will follow. This instrument is invaluable to the proprietor of cattle; and on the smallest farm, would soon repay the expense of the purchase.

Purging being established, an attempt must be made to allay the irritability of the nervous system by means of sedatives; and the best drug that can be administered, we should perhaps be warranted in saying the only effectual one, is opium. The crude opium dissolved in warm water, and suspended by means of mucilage of gum, or the yolk of an egg, will be the preferable form in which to give it. The dose should be a drachm three times every day, and increased to a drachm and a half on the third day, if the effect of the smaller dose is not evident. At the same time the action of the bowels must be kept up by Epsom salts, or common salt, or sulphur, and the proportions of the purgative and the sedative must be so managed that the constitution shall be under the influence of both. It may occasionally be necessary to suspend the sedative for a dose or for a day, when costiveness threatens to prevail. The animal should be supported by mashes, which it will sometimes contrive to eat, or at least to suck up the moisture from them; and as soon as there is any remission of the spasm, the beast may be turned out in a field near at hand during the day, and taken up at night.

A seton of black hellebore root in the dewlap may be of service. It is introduced into a new system—a part not under the influence of the disease—and it often causes a great deal of inflammation and swelling. The back and the loins may also be covered with sheepskins, frequently changed, in order to excite constant perspiration, and, if possible, produce relaxation in the part principally attacked: but the chief dependence should be placed on the copious bleeding at first; a recurrence to it if the spasm becomes yet more violent, or fever appears; and the joint influence of the sedative and purging medicine.

If the disease terminates successfully, the beast will be left sadly out of condition, and he will not thrive very rapidly. He must, however, be got into fair plight, as quickly as prudence will allow; and then sold; for he will rarely stand much more work afterwards, or carry any great quantity of flesh.

CHOREA.

Of this disease, so frequent in the dog, either after distemper, or connected with it, and an affection resembling which we sometimes recognise in the horse under the name of *stringhalt*, we know nothing in cattle.

EPILEPSY.

This is a disease of rare occurrence, but one not easy to treat when it does appear. It attacks animals of all ages, but chiefly those under three years old. There are few symptoms to indicate the approach of the fit, except, perhaps, a little dulness or heaviness which precedes many other diseases, or which might be merely accidental, or the result of very trifling indisposition. All at once, the beast begins to stagger—he falls; sometimes he utters the most frightful bellowings; at other times he makes no noise, but every limb is convulsed; the heaving of the flanks is particularly violent; the force with which the abdominal muscles act would scarcely be credited unless seen; the jaws are either firmly clenched, or there is grinding of the teeth, and a frothy fluid is plentifully discharged from the mouth, mixed with portions of the food, which seem to have been prepared for rumination. The fæces and the urine flow involuntarily.

Sometimes these symptoms do not continue more than a few seconds; at other times the fit lasts several minutes, and then the convulsions become less violent—they gradually cease, and the beast gets up, looks about him, seems to be unconscious of what has happened—at length he joins the herd, and begins to graze as before.

This disease is usually to be traced to some mismanagement with regard to the food. It oftenest attacks young cattle in high condition, and who have lately been turned on better pasture than usual, or who have been exposed to some temporary excitement from over-driving, or the heat of the weather. It is a species of vertigo, or staggers—a sudden determination of blood to the head; and if the farmer does not take warning, mischief will result.

A very serious part of this business is, that the *habit* of fits is soon formed. The first is frequently succeeded by a second, and at length three or four will occur in the course of a day.

Bleeding, physic, and short commons will comprise the treatment here; and the last is the most important of all. Perhaps, however, if the beast were designed for the market at no distant period, the owner will deem it prudent to hasten that time.

PALSY.

We shall not treat here of that loss of power over the hind limbs which occasionally follows parturition, under the term 'dropping after calving;' nor that partial and sometimes total inability to move the hind limbs, which is the slow effect of rheumatism, or swelling of the joints; but that difficulty to move the hinder limbs chiefly which is to be attributed to other causes, or perhaps cannot be traced to any particular cause, except that, in the great majority of instances, it is, after all, more or less connected with a rheumatic affection.

There are many low, woody, marshy situations, the cattle in which are notoriously subject to palsy, It is frequent every where during a cold, ungenial spring; and there are seasons in which it assumes the character of an epizootic. Old beasts, and those that have been worked, are particularly subject to it; and especially when they are cruelly turned out to gather their scanty food during a cold night, after a hard day's work. It is lamentable to think how many of the diseases of our quadruped servants derive their origin from our negligence or cruelty. A damp and unwholesome cowhouse, from which the litter is rarely removed, but putrid effluvia mingle with the aqueous vapour that is continually rising, is a fruitful source of palsy, and especially if to this is added the baneful influence of scanty and bad food and stagnant water. Old cows, whose milk has been dried and who cannot be made to carry much flesh, are very subject to this complaint.

Palsy is usually slow in its progress. There appears to be a general debility; perhaps referable to the part about to be attacked more than to any other; and it will be afterwards recollected, that there was a giving way, or trembling of that part, and sometimes, but not always, a coldness of it. The hind limbs are the parts which are most frequently attacked. It is at first feebleness which increases to stiffness, awkwardness of motion, and at length to total loss of it. We have seen a few instances in which the fore limbs have been the principal seat of the disease, but then the hind limbs have always participated in the affection. In no case, however, have we seen any affection of one side of the animal and not of the other; this is a difference in the symptoms of palsy in the human being and the brute, for which we are not able satisfactorily to account.

In many parts of the kingdom this complaint is traced to a most ridiculous cause. The original evil is said to be in the tail; and all maladies of this kind, involving the partial or total loss of motion of the hind limbs of the animal, are classed under the name of *tail-ill* or *tail-slip*. Our friend Mr. Dick, of Edinburgh, has taken up this subject in a very interesting point of view, in the 14th Number of the Quarterly Journal of Agriculture; and the public are much indebted to him for dispelling a false and injurious and cruel superstition. The farmer and the cowleech believe that the mischief passes along the cow's tail to the back, and that it is on account of something wrong in the tail that she loses the use of her legs; and then some set to work, and cut the cow's tail off: while others, less cruel, or more scientific, make an incision into the under surface, and allow the wound to bleed freely, and then fill it up with a mixture of tar and salt, and we know not what.

In some parts of the country, the practitioner is not content with this treatment, but, supposing there is witchcraft in the business, he has recourse to some charm in addition to the cutting and dressing. This charm consists in binding a small piece of the rowan tree on the extremity of the tail, and making a black cat pass three times round the cow's body, over her back, and under her belly, which (if it happens to be a strange cat, as is often the case from the necessity of the colour, being black) so enrages the animal, that she mews and scratches with all the fury to which she is so easily excited, until she escapes from the hands of the necromancers, leaving them convinced that the devil has got into the cat.

Mr. Dick, with a kind consideration, for which he deserves much credit, condescends to reason the case with these foolish people, and what he says is so much to the purpose, that we cannot refrain from introducing it here. 'The disease, in ordinary cases, is said to consist in a softening of the bones about the extremity of the tail, and is to be distinguished by the point of the tail being easily doubled back upon itself, and having at this doubling a soft and rather a crepitating kind of feel. But what is the real state of the case? The tail is lengthened out to the extent of about three feet, and is formed like a common whip. Towards the extremity, the bones terminate gradually, becoming insensibly smaller as they proceed downwards. At this part is said to be found a soft space—the *tail-slip*. Beyond this again, a firm swelling cartilaginous portion is found, covered with hair to brush off the flies within its reach. Now why have we the long column of bones; the termination with a soft space of a few inches; this thickened, hard, cartilaginous part at the very extremity, and that extremity covered with hair, but with a view to form a whip to drive off, and with the greatest possible effect, the insects which wound and torment the animal?

'Here the column of bones forms the shaft or handle of the whip—the soft part, the connexion between the handle and the thong, while the thickened extremity may be easily recognised to represent the thong, and the hairs to form the lash, or point; so that we have a whip to drive away the flies, and so complete a one, that the coachman may borrow a lesson from its construction.'

We trust, therefore, that our readers will never be found again looking at the tail of the cow for an explanation of palsy, or any other complaint; (for we believe this *tail-slip* is supposed to be connected with various other maladies;) but we will allow them to examine it once more, in order to admire its adaptation to the purpose for which it is required, and the peculiar contrivance of this supposed diseased part, for the more effectual accomplishment of this natural purpose.

It may, however be asked—is not relief sometimes given by these operations on the tail?—Very probably. We do not know what would make a cow get up and use her limbs if the punishment of the knife, and the rubbing-in of tar and salt failed; and we can very readily conceive that the loss of blood would often be beneficial, but not more because taken from the tail than from any other part.

The most frequent cause of palsy is the turning out of beasts of every kind, but particularly cows, too early to grass, after they have been housed during the winter and first part of the spring. We have known one-fourth of the stock completely chilled and palsied behind in the course of two or three nights. The general health has not been much affected, except that, perhaps, hoose has come on; but the beasts have lain three or four weeks (we recollect one that lay three months) before they recovered the use of their limbs.

The treatment of this disease would be half summed up in one word—*comfort.* The cattle should, if possible, be immediately removed into a warm, but not close, cow-house, and well littered up, and perhaps a rug thrown over them, It has been proposed to sling them, but they are rarely comfortable in the slings, and very frequently galled. If they are well littered up, turned twice in the day, and so laid that the fæces and urine will flow from them, they will be much better without the slings.

Physic should be the first thing administered. This species of palsy is usually attended by considerable constipation, *which must be overcome;* but with the physic, a good dose of cordial medicine should always be mixed. We would give an ounce of powdered ginger, and we would crown the whole with a half pint at least of good sound ale. Except in diseases of a decidedly inflammatory nature, or of such a state of nervous irritability, as tetanus, the physic of cattle should be mixed with aromatics, and frequently with ale too. It is to the administration of these cordials in cases of fever that we so peremptorily object; there is no occasion that fuel should be then added to fire; but in general cases, there is something in the constitution of the cow with which mild cordial medicine does not disagree.

The patient does not quite refuse to eat in palsy, but there is usually an indifference to food. This is another reason for giving a little cordial with the physic. The beast should be coaxed to eat—the food which is in season should be offered to it, and frequently changed. Two-drachm doses of antimonial powder has been recommended as a diaphoretic, but we have not much faith in the action of this drug on cattle. Good hand-rubbing, and plenty of it, should be used two or three times every day about the loins; a stimulating liniment may also be applied, consisting of equal parts of spirits of turpentine, camphorated spirit, and hartshorn. The chief dependence is on keeping the bowels open, and the animal comfortable; and then in a variable period, from ten days to a month, he will usually get up again.

There is an account in one of the French journals of the cure of a paralytic ox, by the administration of nux vomica. We are not aware that it has been tried by any English veterinarian. The strychnine would be worth a trial where the purgative comfortable system fails; but that succeeds so often, that we should be loth to have recourse to any thing else in the first instance. The nux vomica effected a cure, but the doses were enormous, consisting of more than an ounce each.

NEUROTOMY.

Veterinary surgeons have lately adopted an admirable method of relieving the pain which the horse must otherwise endure from several diseases of the foot. They cut out a portion of the nerve of the leg. They cannot interfere with the motion of the limb, because there are no muscles beneath the knee for the nerve to supply; but they cut off the communication of the feeling of pain. If a nerve concerned with feeling is divided, the impressions, whether of pleasure or of pain, made on it, below the division, cannot be conveyed to the brain, and therefore the animal is totally unconscious of them. Many a valuable animal is thus relieved from torture, and perhaps his services are retained for many a year.

We know not why this should not be applied to cattle. The working ox is subject to several diseases of the feet, the consequence of shoeing and hard labour, and which are as painful and as difficult to treat as those of the foot of the horse. From the division of his foot, and the hardness and occasional inequality of the ground, and the consequent inequality of pressure on the two pasterns, he is subject to sprains of the fetlock joint, and injuries of the shank-bone, which are rarely or never seen in the horse. Enlargements of the lower head of these bones are frequently found in the ox, that have no parallel in the disorganization of the fore limbs of the horse. While labouring under these diseases, the animal is capable of little work, and will not carry much flesh. Besides this there are diseases which may be said to be natural to cattle, and which are productive of a great deal of pain, and materially lessen the profit that we derive from these animals. There is not a farmer who has not had cows in his dairy that have lost, for a time, full half of their milk, on account of the pain which tender or diseased feet have occasioned. There is not a grazier who has not occasionally lost the advantage of three and four months' feeding from the same cause. In the London dairies tender feet is often a most serious ailment; and compels the milkman to part with some of his best cows, and in very indifferent condition too.

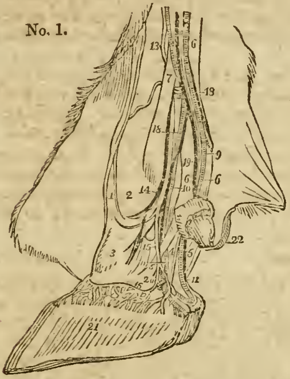
Why should not the operation of neurotomy be resorted to here? There is nothing difficult in it to any one who is acquainted with the anatomy of the part; and its beneficial effect cannot admit of dispute. It is likewise free from many of the objections which attend the same operation on the horse. The alteration in the going of the animal, and the jolting and somewhat dangerous uncertainty of action would not be regarded, or at all observed here. The ox seldom would be subject, and the cow never would, to that hard and rapid work which, the sense of pain being removed, has a tendency to batter and bruise the parts, increase the inflammation, and aggravate the evil.

The operation is thus performed:—The ox is cast and secured, the hair having been previously cut from the limb or limbs to be operated upon. The leg is then to be removed from the hobbles, and distended, and a tight ligature passed round it beneath the knee, to prevent bleeding. Then, on the centre of the back of the leg, (the cut, p. 308, No. 1, represents the left leg,) but a little inclining towards the inside, and about 2½ inches above the fetlock, the artery will be felt for, and recognized by its pulsation. Lying immediately inside the artery, towards the other leg, is the vein, and close to that the nerve; so that the nerve will be found about one-sixth part of an inch within the artery. The artery, we repeat, is recognized by its pulsation—the vein by its yielding to the pressure of the finger, and the nerve by its being a hard, unyielding body. The operator then makes a cautious incision, an inch and a half in length upon the nerve, taking care merely to cut through the integument. The cellular substance is dissected through, and the nerve exposed. A crooked needle, armed with silk, is next passed under it, to raise it a little; it is dissected from the cellular substance beneath, and about three-quarters of an inch of it cut out; the first incision being made at the upper part, in which case the second cut will not be felt. There is only one nerve to be excised here, because the operation is to be performed a little above the bifurcation of the nerve.

The edges of the wound are now brought together; a small bit of tow or lint is placed over them, and upon that a bandage is drawn tolerably tight. The wound should not be examined for the first three days, after which it may be dressed with healing ointment, or the tincture of aloes. In about three weeks it will be quite healed, but the relief will be immediate, and the milk of the cow will return, and the grazing beast will begin to fatten in the course of a day or two.

We give a cut (No. 1) of the lateral and posterior part of the leg and foot of the ox, showing the distribution and relative situation of the blood-

No. 1.



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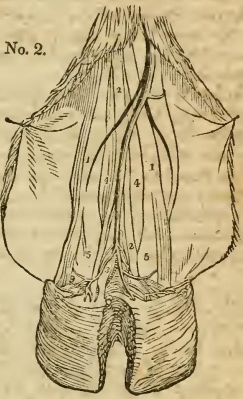

[*Leg and Foot of the Ox.*]

No. 1.

1. The tendon of the extensor of the foot.
2. Capsular ligaments of the fetlock joint.
3. Capsular ligaments of the pastern joint.
4. Tendon of the perforans muscle.
5. Ligamentous portions.
6. Tendons of the perforans and perforatus muscles.
7. Division of the tendon of the carpo-phalangeus.
8. The lateral external artery of the canon, or shank.
9. The mesian and posterior artery of the fetlock.
10. The lateral internal artery.
11. The posterior branches of the plantar arteries.
12. The lateral external vein of the canon.
13. The lateral internal vein of the canon.
14. The lateral vein of the pastern.
15. A branch which is formed by the plantar veins, and the venous reservoir of the plantar.
16. The vascular reservoir, covered in part by the coronet.
17. The plantar nerve before its bifurcation.
18. Nervous branches, which after having parted from the preceding, take a direction, the one backward and downward to the lateral and external part of the fetlock, and the other downward to the internal part of the same joint.
19. The mesian division of the same nerve. It pursues its course by the artery of the same name.
20. A continuation of the plantar nerve, accompanying the internal lateral artery.
21. The sensible laminæ of the coffin bone, corresponding with the horny laminæ of the hoof.
22. The usual horny excrescence at the posterior part of the fetlock.

No. 2.

1. The tendons of the extensor of the pastern below the bifurcation.
2. The tendons of the extensor of the foot.
3. Internal lateral ligaments.
4. The capsular ligaments of the fetlock joint.
5. The capsular ligaments of the pastern joints.
6. A portion of integument, which unites the two hoofs at their superior and internal part. The blood-vessels brought principally into view, are, the superficial veins of the leg above; the anastomosis of the profound and superficial veins below, between the figures 2, 2; and the superficial plantar arteries and veins, still lower down.

vessels and nerves of those portions of leg, fetlock, and foot. Besides these there is only one superficial nerve accompanying the superficial vein down to the centre of the great metacarpal, or rather, in the young animal, the suture or union between the two bones, few or none of whose fibres extend below the fetlock, and which may be easily got at and divided in disease of that joint.

The cut (No. 2) is introduced to show how few nervous branches extend down the front of the lower part of the leg; and how completely the object of neurotomy will be accomplished by the division of the nerve at the posterior part of the leg, in the manner that we have recommended it to be done. The figures may illustrate the anatomy of the fore-part of the fetlock and pasterns of the ox. The nerves are represented by a plain black line as in No. I.

It will be seen from the foregoing cut, that there will be plenty of room for fanciful theory as to the precise portion of the foot which is diseased, and the branch of the nerve which it will be proper to excise. There are the two lateral and the median trunks for the operator to choose from; but as he who is wise, *when operating on a beast of draught or slow action*, will always make sure of his case, and excise the nerve above the fetlock in the horse, so the prudent man will operate on the ox sufficiently above the fetlock, and rather above than below the situation marked 17 in the cut, and before the division of the nerve.

RABIES.

There is one more disease of the nervous system, the most fearful of the list, viz. RABIES. When a rabid or mad dog is wandering about, laboring under an irrepressible disposition to bite, he seeks out first of all his own species, he travels out of his road to attack them: but if his road lies by a herd of cattle he will attack the nearest to him, and if he meets with much resistance he will set upon the whole herd and bite as many of them as he can.

Many nostrums have been celebrated as preventing the appearance of the disease, but no confidence can be placed on one of them. Let the farmer save his money, and perhaps the life of the beast, by giving credence to this. There are old women in many a village who prepare wondrous preventive drinks, but the stories of their success are mere 'old women's stories' and nothing else.

When there is any suspicion that a beast has been bitten, the wound should be carefully searched for. If any one was by when the attack was made, he probably will be able to point out the limb that was most in danger, or that was actually seized.

The wound being discovered, the hair must be cut from the edges of it, and the lunar caustic (nitrate of silver,) the stick being reduced to a point, introduced into it, and brought in contact with, and made thoroughly to act upon, every part of it. If there is any doubt about the probability of the caustic coming into contact with every part of the wound, it must be enlarged with the knife, so as to give free access to the substance applied. This is the only preventive, and the caustic being freely used upon the whole of the wound, and there being no other wound, the beast is safe. But who, on an animal thickly covered with hair, will venture to say that there is no other wound? It also unfortunately happens that the slightest scratch neglected is as dangerous as a lacerated wound.

In this state of uncertainty, therefore, the farmer must look out for the worst. If the disease is to appear at all, it will be about the expiration of the fifth week, although there will be no absolute security in less than double the number of months.

Then the beast will appear dull, languid, feverish, scarcely grazing, and idly ruminating. These may be the precursors of many a different illness, and the previous circumstances alone could excite suspicion of what is about to follow. The eyes become anxious, protuded, red—there is considerable discharge of saliva, and to this succeeds a thirst that can scarcely be quenched. There is no hydrophobia, no dread of water at any time. This is a circumstance which cannot be too strongly impressed on the mind, and which may preserve him from danger, anxiety, and fear, who has to do with domesticated animals of any kind—that the constant and characteristic dread of water is confined to the human being. The horse and the ox, and the sheep, occasionally exhibit a momentary dislike to fluids but generally they will drink to the last, and their desire of water is increased rather than diminished by the disease. The dog never has dread of water.

As in the dog, so also in the ox, the disease, from some cause unknown to us, takes on two essentially different characters. The dog, labouring under what sportsmen call dumb madness, is frequently harmless through every stage of the complaint; so in the ox, the symptoms that we have mentioned are succeeded by frequent and pitiful lowings—a continual and painful attempt to evacuate the fæces. Staggering and weakness of the loins appear on the second or third day, and this is soon succeeded by palsy of the hinder extremities. The animal sits on its haunches, making ineffectual attempts to rise—looking woefully around it, and eagerly plunging its muzzle into the water, when placed within its reach, but it makes no attempt to do mischief. At other times, the early symptoms are succeeded by a dreadful state of excitation. The animal is eager to do every kind of mischief; he stands across the path bellowing incessantly, and tearing up the ground with his horns. In a few cases, the quiet and melancholy madness suddenly changes into that of a ferocious character. There is no cure now; no nostrums will have avail here: and the animal should be destroyed as soon as possible. One circumstance also should be carefully remembered. The poison in all rabid animals seems to reside in the saliva; and the saliva of an ox is as dangerous as that of a dog. We inoculated a dog with the saliva of a rabid bull, and it also became rabid and died. Dr. Ashburner inoculated a fowl from the saliva of a rabid cow, and two months afterwards the fowl had a wild and strange appearance, and its eyes were blood-shot: it ran at the other fowls, and became gradually paralytic and died.

The rabid ox may attempt to do more mischief with its horns than its teeth, but occasionally it will bite; or, if it should not, yet it must not be meddled with too much. This dangerous foam is continually running from the mouth; it may fall on a sore place, and it is then as dangerous as if it had entered the circulation by means of a bite.

The knowledge that the virus is confined to the saliva will settle annother matter that has occasionally been the cause of considerable uneasiness. A cow has been observed to be somewhat alien for a day or two, but she has been milked as usual; her milk has been mingled with the rest, and has been used for domestic purposes as heretofore. She is at length discovered to be rabid. Is the family safe? Can the milk of a rabid cow be drunk with impunity? Yes, perfectly so, for the poison is confined to the saliva. The livers of hundreds of rabid dogs have been eaten in days of ignorance, dressed in all manners of ways, but usually fried as nicely as possible, as a preventive against madness. Some miscreants have sent the flesh of rabid cattle to the market, and it has been eaten without harm; and so, although not very pleasant to think about, the milk of the rabid cow may be drunk without the slightest danger.

CHAPTER X.

THE ANATOMY, USES, AND DISEASES OF THE NOSTRILS AND THE MOUTH.

The nasal cavity of the ox contains the apparatus for the sense of smell, and is also devoted to the purpose of respiration. It is one of the commencements of that succession of passages by which the air is conveyed to and from the lungs; but as the ox partly breathes through the mouth there are found in the cavity of his nose, contrivances for the greater perfection of the smelling, which could not have existence in the nasal cavity of the horse.

THE NASAL BONES.

From the great developement of the frontal bones, in order to form a secure basis for the horn, all the bones of the face are proportionately diminished, and pushed out of their situation; and therefore the *nasal bones* in the ox (*b*, p, 273, and *q*, p. 274) are little more than a third so large as those of the horse, (*p q*, p. 66, and *a*, p. 68 'Horse'.) They are connected, as described in the horse, with each other, and with the frontals (*c*, p. 273 and *b*, p. 274.) with the lacrymals (*c*, p, 273,) with the superior maxillaries (*a*, p. 273 and *x*, p. 274,) and with the anterior maxillaries (*z*, p. 274.) They are pushed down quite out of their place, and not being so much in a situation of danger, for a blow aimed at the head of the ox would usually fall higher, there is not the intricate and mortoised connexion with any of the other bones except the frontals, which is found in the horse. They are broad in proportion to their length; and as, on account of the construction of the mouth of the ox, the muzzle of that animal was destined to be broader than the muzzle of the horse, each bone terminates in two points, with a hollow between them; and as the inside points of the two lie in contact with each other, the nasal bones may be considered as actually ending in three points instead of one, and occupying a considerably-extended surface. It is thus wide for the greater attachment of muscle and cartilage; for the muzzle must be broad and thick and strong in order to compress and hold the grass firmly, until it is partly cut and partly torn by the pressure of the incisors of the lower jaw on the pad that will be presently described, and which occupies the place of the teeth in the upper one.

If the nasal bone is more closely examined, it will be found that it does not consist, in its under surface, of one continuous arch as in the horse; but that there is an additional channel hollowed out of it, and running along the crown of the arch. It can be seen above (*r*, p. 274.) This is an addition to the upper meatus or passage of the nose (seen in cut p. 68, Horse) above the upper turbinated bone, and which has nothing to do with the act of breathing, but terminates in a blind pouch, so that the air shall, as it were, loiter there, and any odoriferous particles which it carries, make a stronger impression on the membrane of the nose. Only a very small meatus could be spared to the horse, because the nostrils were, the only air-passages he had; but a larger one can be given to the ox, for a portion of the air enters and is expired through the mouth. Therefore, and for other reasons that will be stated presently, the ox has an acuter sense of smell than the horse.

THE OTHER BONES OF THE NOSE.

Compare together this meatus or blind passage above *s*, in p. 68, 'Horse,' and above *r* in p. 274 of this treatise.

The *superior maxillary* bone, although much smaller than in the horse, forms the greater part of the wall and floor of the nasal cavity. It contains the upper grinders on either side. Its floor does not consist of a single plate of bone, but of sinuses or cells, like those of the frontal parietal and occipital bones. The same principal seems to be pursued—lightness where it could be obtained consistently with strength, as a compensation for the weight of the horn. This bone is represented at *a*, p. 273, and *x*, p. 274, and may be compared with the same bone at *l*, p. 66, 'Horse.'

The *anterior maxillary*, (*z*, p. 274.) containing no incisor teeth, is a very small bone compared with that of the horse. We shall have to speak more of it presently.

The *palatine bone* (*p*, p. 274) is larger in the ox than in the horse, and occupies a greater portion of the palate and the floor of the nose.

CONTENTS OF THE NASAL CAVITY.

The nasal cavity contains the *septum*, a cartilaginous division extending from the suture in the roof between the nasals, to a long bone in the form of a groove, and named the vomer, and placed on the floor; and from the top of the nasals to the æthmoid bone, dividing the nose into two equal parts. In the horse, the division was perfect, there was no direct communication between the two nostrils, and this was designed to limit the ravages of that most dreadful of all the disorders to which the horse is subject—glanders; but the ox, being in a manner exempt from glanders, or at least from any disease bearing the dreadfully contagious and fatal character of glanders in the horse, there is no necessity for this perfect division, and therefore the vomer, when it has reached about half way up the cavity, begins to leave the floor; and it separates from the floor more and more, as it approaches the posterior part of the nostrils, leaving a free and extensive communication between them. This gives room for still more effectual provision to be made for the perfection of the sense of smell, and which we will now describe.

THE SENSE OF SMELLING.

The *olfactory*, or first pair of nerves, connected with the sense of smelling, is abundantly larger in the quadruped than in the human being; for in the one it is merely connected with occasional pleasure, or perchance annoyance; in the other it is connected with life itself. The same nerve differs in size in different quadrupeds, according to the necessity that each has for an acute sense of smell. The brain of the ox is not more than half the size of that of the horse, and he does not possess the intelligence of the horse; but, as we have before observed, not being so much domesticated—being oftener sent into the fields to shift for himself—or, if worked by day, being usually turned out at night, he has occasion for acuter smell, and his olfactory nerve is nearly as large as that of the horse; and (which is the right way of judging,) comparing the bulk of the two brains, it is a great deal larger.

This nerve comes in contact with a thin plate of bone, the *cribriform* plate, (perforated like a cullender,) of the æthmoid bone, and which divides the nasal cavity from that of the skull; the somewhat thickened portion of another bone interposed between these plates is seen at *n*, p. 274. The pulpy matter of the nerve is pressed through the holes of this bone, and spread over a portion of the membrane of the nose. It is the impression which is made by the odoriferous particles of bodies striking on this diffused pulpy matter, that produces the sense of smell; and in proportion to the extent of surface over which the nerve is spread, is the acuteness of the smell.

The ox partly breathing through the mouth, and the air passage being widened by the removal of a portion of the septum, provision can be made for the more extensive diffusion of the nervous pulp. Nearest to the skull, and situated at the upper part of the nasal cavity, are the cells of the æthmoid bone, (*r*, p. 274,) and if these are compared with the cells of the same bone in the horse, (*l*, p. 68,) the superior development of them in the ox will be evident. The lower cell of the æthmoid labyrinth is so much lengthened in the ox, that it is sometimes described as a third turbinated bone. It is represented at *u*, p. 274. Below these are the two turbinated bones, (*s* and *t*, p. 274,) both of them, and especially the lower one, considerably more developed than in the horse. Each of these bones is composed of a labyrinth of cells, divided from each other by wafer-like plates of bone, perforated like the cribriform plate of the æthmoid bone—lined by the Schneiderian membrane, with the nervous pulp spread over or identified with that membrane—and a thousand communications between the membranes in every part, by means of the gauze-like perforated structure of the plates.

This membrane is either covered with an unctuous fluid, or the air passages are so complicated that the pure atmospheric air alone is suffered to pass; the slightest odoriferous particle or solid substance of any kind is arrested. The confirmed snuff-taker will afford a sufficient illustration of this. However enormous may be his pinch, and with whatever force he may sniff it up, not an atom finds its way to the lungs, or even into the larynx; the whole is arrested by some portion or other of the Schneiderian membrane. This is not only a wise provision for the perfection of the sense of smelling—it not only secures the contact of every particle with the membrane of the nose, and its temporary lodgment there, but it protects the air passages from many a source of annoyance, danger, and death. Considering the numerous deleterious substances which, under one form or another, are floating in the air, it is scarcely possible to conceive how any animal could live an hour without some such protection to the lungs as this affords.

Nature, then, has provided an acute sense of smell for the ox: it was wanted. It was necessary that the animal should detect the peculiar scent of every plant, as connected either with nutrition or destruction. Instinct perhaps teaches him much, but he is more indebted to the lessons of experience. In the spring of the year, when the scent of the infant plant is scarcely developed, cattle are often deceived with regard to the nature of the herbage; they are subject to peculiar complaints of indigestion; and they are sometimes poisoned.

When the great Linnæus visited Tornea, the inhabitants complained of a distemper that had killed many of their cattle, and especially when first turned out into the meadows in the spring. He soon traced the disorder to the water-hemlock, which grew abundantly there, and which in the spring the cattle did not know how to avoid. The power of instinct is great in animals that have not been reclaimed from a state of nature; but in proportion as they become domesticated, instinct ceases to prompt, and they are dependent on our guidance, or on the lessons which experience teaches. Thus when our calves and lambs are taken too soon from the dam, and turned with little or no experience into the pasture, they eat indiscriminately of every herb that presents itself, and many of them are lost. Had they been suffered to browse a little while, or a little longer with the mother, she would have taught them to distinguish the sweet and wholesome herbage from the deleterious and destructive; and their keen sense of smell would have imprinted the lesson for ever on their minds. This is a point of agricultural economy not sufficiently attended to.

BLEEDING FROM THE NOSE.

Working oxen, and especially those that are in tolerably high condition, are occasionally subject to bleeding from the nose, and sometimes very profuse bleeding. If he is too hardly and too long worked during the heat of a summer's day, nasal hæmorrhage may occur; we, however, have been accustomed, whatever may be the excuse of the story of the servant, to trace the bleeding to blows inflicted on the nasals or on the muzzle by a brutal drover or ploughman, far oftener than to any other cause. It is not often that any unpleasant consequences have ensued. The bleeding has gradually ceased, except in one case, when it returned again and again, and would have destroyed the beast had not the result of the case been somewhat anticipated.

LEECHES IN THE NASAL CAVITY.

We had often heard of leeches having fastened on the muzzle, and then crept into the nostril of the ox when drinking at a stagnant pool, and which the ox is strangely fond of doing. One of these blood-suckers having once introduced himself into the cavity, will usually shift from place to place, biting here and there, and causing a very considerable hæmorrhage. The beast will tell us plainly enough the cause of the bleeding, by the uneasiness which he will express, and by his continually snorting and tossing his head about.

On examining the nostril in a good light, the leech may sometimes be seen. It was so in a case that we recollect; and covering the end of the finger with a little salt, we were enabled to introduce it sufficiently high to detach the blood-sucker from his hold. At other times when a leech is suspected, salt and water may be injected up the nostril. At all events, however, when he is fully bloated, the intruder will detach himself; and, except he has crept up the superior meatus, through which there is no air passage, he will be expelled by the sneezing of the ox. Only temporary inconvenience can result from this accident, for the bleeding will in due time stop, even from so vascular a membrane as that of the nose.

POLYPUS IN THE NOSE.

This is a rare disease in the horse, and still rarer in the ox. We have seen only one case of it; and that might have been said to be more polypus in the pharynx than in the nasal cavity, had not its pedicle been traced into that cavity, and seemingly attached to the upper part of the inferior turbinated bone. A cow was anxious to eat; and was otherwise in good health; but occasionally she was unable to swallow, and the pellet was returned with an effort resembling vomiting. This increased until she was scarcely able to eat, and was rapidly losing flesh. The case indicated some disease of the back part of the mouth, or the commencement of the gullet; and we caused one of the pieces of wood through which the tube of the stomach-pump is passed into the mouth, to be made with an aperture sufficiently large for the hand to go through. The cow was secured and the mouth-piece fixed, and the hand passed into the fauces, when a round body, moveable and attached by a cord, was felt—an evident polypus, the pedicle of which could be traced upwards and forwards into the cavity of the nose, but the termination of which could not be reached. It was seized with a pair of strong forceps with deeply roughened blades, and attempted to be removed by *tortion*, i. e., by twisting it round and round until it broke. At the third turn the pedicle gave way, and a polypus nearly half a pound in weight was brought out. Polypi should be removed by a ligature round the pedicle, and as near to the root as possible, or by tortion, and by the former whenever it can be effected.

CORYZA.

By this term is meant inflammation of, and defluction from, the nasal cavity, or the cells with which it is connected; when the same affection extends to the fauces, it becomes catarrh. Catarrh is usually connected with coryza, and is the natural consequence or progress of it; but simple coryza may and does occasionally exist in the ox. We are too often teased and frightened by a discharge from the nostrils, mucous, purulent, fœtid, and excoriating, and *unaccompanied by cough.* It is seen in crowded, and over-heated cow-houses; it arises from imprudent exposure to extreme cold, and it is frequently produced by the dust and gravel of the road. The ox was not designed to be exposed like the horse to this last annoyance; and he has no false nostril to turn off the current of minute and irritating particles from the more susceptible parts of the nasal cavity. Therefore, oxen driven any considerable distance to fair or market in sultry, dusty weather, usually suffer from coryza. Dairymen whose cows have to travel half a mile or more on a dusty road, wonder that, with all their care, their cattle should have such frequent discharge from the nose, and that this should sometimes run on to hoose. The cause is plain enough, although little suspected by them.

There is a periodical coryza in cattle. During the winter season, and probably from our mismanagement—from undue exposure of the animals to cold, or to the extremes of heat and cold, there is considerable nasal gleet, not interfering much with health, but unpleasant to the eye and annoying to the animal, and which, in despite of the most careful treatment, will remain. When, however, the genial warmth of spring returns, it sometimes gradually disappears. This, however, is one of the most favourable cases; for it will occur that, from some improper management, hoose or cough has gradually become connected with the nasal discharge. The farmer has not observed this connexion, nor is he alarmed although the cough should remain when the nasal discharge ceases: nay, he cares little about it, although the cough should be a frequent and harassing one, if the beast does but carry its usual flesh, and yields its full quantity of milk: when, however, the milk fails, and the cow begins to lose condition, he, for the first time, looks about him, and then it is too late. We shall return to this point again and again; for it is the source of the greater part of the mischief attendant on chest affections in cattle.

We are now, however, speaking of coryza, inflammation of, and discharge from, the membrane of the nose. It is a matter of the utmost importance for the proprietor of, or the attendant upon cattle, to assure himself that it is simple coryza. He should carefully examine whether there is any cough, especially whether that cough is painful—any increased labour of breathing—any diminution of appetite—suspension of rumination—fever? The pulse, felt at the left side, and the temperature of the root of the horn, will best ascertain this last particular.

If there is nothing of these, still we have inflammation, and of a character that soon connects itself with some or all of them; therefore a mash may be given in the evening, and a few doses of cooling medicine.

The best fever medicine for cattle is nearly the same as that recommended for the horse, but in doses of only half the quantity. Half a drachm each of powdered digitalis and emetic tartar, and two drachms each of nitre and sulphur, will constitute the medium fever-powder, to be given as occasion may require, and increased or diminished in quantity, according to the size and age of the beast, and the intensity of the disease. This should be given in the form of drink, for reasons that will hereafter be stated.

If the proprietor or the practitioner is assured that it is simple coryza, he may add half a drachm of sulphate of copper (blue vitriol,) finely powdered, to the other ingredients. This drug seems to have a peculiar and a very beneficial termination to the Schneiderian membrane, and is very useful in pure inflammation, or ulceration of that membrane, or discharge from it. A very slight degree of hoose, however, and particularly of painful hoose, should be received as a sufficient indication that the fever-powders alone are to be used.

If the coryza degenerates into catarrh, bronchitis, or inflammation of the lungs, the proper treatment will be indicated when those diseases are taken into consideration.

GLANDERS.

Of this dreadful disease of the membrane of the nose in the horse, we have never met with a case in cattle. Some singular accounts are on record, but they are of doubtful authority. We acknowledge that this is not a point fairly settled, and it deserves peculiar attention from the proprietors of cattle.

FARCY.

There are cases, however, the authenticity of which cannot be doubted, which bear a closer resemblance to *farcy*. One of the most frequent and decisive characters of farcy in the horse, is inflammation, and thickening of the absorbents, and particularly at the situation of the valves. They have a *corded* feeling through a certain portion of their course; and little tumours, *buds* or *buttons*, appear at a greater or less distance from each other along the cord.

There were four oxen in a farmer's yard, each of which had considerable cough, and a large corded absorbent could be traced in each from the fetlock up to the forearm. Farcy-buttons were evident, not only to the touch, but to the eye, through the whole extent of the corded vessel. Most of them were hard, scirrhous; and others had suppurated and ulcerated. The hot iron was applied to the *buds*, the wounds healed, the cordiness of the absorbents gradually diminished, and the cough disappeared.

Two months afterwards, however, the farcy-buttons and the corded absorbents were seen again, and *the cough returned at the same time.* The same means were adopted with the same results. All appeared to be cured. Two of them were sold, and on the other two the disease did not return, nor was it communicated to any of the cattle that grazed in the same pasture. It should be observed that these cases did not all appear at the same time, but a space of three years occurred between the first and the last.

Was this farcy?—need the farmer entertain serious apprehension of this fatal disease breaking out in his herd? The practitioner to whom they occurred related them as cases of farcy; but we confess that we are very much of opinion that he was mistaken. We have seen many cases of this inflammation of the absorbents, where farcy could not be suspected. If an ox has had foul in the foot, or deep and painful ulcers about any of the joints, the corded absorbent is seen above, and the little buttons on each of the valves. The foul in the foot, or the ulcerated joints, having disappeared, the corded absorbent has also gradually vanished, yet not always; for we recollect cases in which the buttons have burst, and degenerated into ulcers, exceedingly difficult to heal, and the matter from which has corroded and ulcerated the neighbouring parts. In other instances we have known inflammation extending up the leg, and involving the whole of the cellular membrane, and even destroying the animal by the constitutional disturbance which it created. There was no farcy in these cases; it was not for a moment suspected; and the decided preponderance of our opinion, and we are happy in being able to record it, is, that cattle are exempt from glanders and farcy.

THE BONES OF THE MOUTH.

The sides and the greater part of the roof of the mouth are formed by the *superior maxillary*, or upper jaw, seen at *a*, p. 273, and *x*, p. 274. This, like the other bones of the face, is materially diminished in size by the great development of the frontal bones. It articulates with the lacrymal bone at *c*, p. 273, and the malar bone at *d*. The ridge which runs down from the malar bone, in the horse, for the attachment of the masseter muscle, and which may be seen below *k*, (p. 66, Horse,) is wanting; but the surface of the bone is roughened and tuberculated, to answer the same purpose. Immediately above the foremost of the upper grinders in the cut of the skeleton, p. 273, is a little black mark, representing the foramen, or hole through which the nerves and blood-vessels proceed, to supply the lower part of the face.

The superior maxillary consists of two plates, irregularly separated from each other; the outer forms the external, and the other the internal wall of the mouth, as seen at *x*, p. 274; and then extending upwards, and assuming an arched form, the commencement of which is seen at *x*, it constitutes the greater part of the bony roof of the mouth. The inferior cells of the external part contain the back teeth, or grinders; the superior ones are the maxillary sinuses; and in the ox there is a new set of cells, formed by a separation of the plates of the bone, between the roof of the mouth and the floor of the nasal cavity.

The *palatine* bone, *p*, p. 274, occupies considerably more of the roof of the mouth than it does in the horse.

The *anterior maxillary* bone is, compared with that of the horse, a very insignificant one; there is neither the firm and complicated connexion with the superior maxillary, nor are there any tusks, or incisor teeth. There are likewise considerable apertures, one of which is seen between *x* and *z*, p. 274, which leave a somewhat extensive part of the roof of the mouth and floor of the nose occupied only by cellular substance and membrane. There is little strength required in the part, and therefore there is little provision for it.

At the base or floor of the mouth is the *inferior maxillary*, or lower jaw (*j*, p, 273.) It also partakes of the shortness of the bones of the face, and is somewhat altered in form. It contains the only incisor teeth which cattle have, eight in number, and six molar teeth on each side. It has not the tuberosity which is found in the lower jaw of the horse, (*a*, p. 63, Horse,) but goes back in a manner straight to the angle, where it turns to take an upper direction towards its joint with the temporal bone. The consequence of this is, that the muscles, both on the inside and the outside, are smaller and weaker. Power is not wanted; for the grinders are little if at all used in the first gathering and mastication of the food, and the act of rumination is generally very leisurely and lazily performed.

This difference in the form of the jaw throws the submaxillary artery further back in cattle than in the horse. It is to be sought for a couple of inches nearer to the angle of the jaw, and sometimes it is scarcely to be discovered.

Below *g*, p. 273, is seen the process of this bone, shorter than in the horse, round which the temporal muscle is wrapped, and by which this bone is moved; and a little lower is the shallow cavity of the temporal bone, into which the proper head of this bone is received, and with which it forms a joint. The ridges at either end of this cavity in the horse (see p. 136) are very materially lowered here, so as to allow more latitude of motion, and admit of the grinding action by which rumination is principally characterised. The muscle, being inserted so near to the joint, acts with great mechanical disadvantage; but, although smaller than in the horse, it is sufficiently powerful for every purpose that is required.

THE CHEEKS.

The outer walls of the mouth are the cheeks and lips. The cheeks consist principally of muscle, (the masseter and the buccinator muscles.) They are covered externally by the common integument, or skin; and lined by the membrane of the mouth. There is likewise considerable glandular substance in their composition, and these glands have distinct openings into the mouth, and assist in supplying it with moisture.

THE LIPS.

The lips form the anterior opening of the mouth; they close it, and assist in gathering and retaining the food. They likewise consist of muscular, glandular, and cellular texture; and of much, and in the upper lip especially, of condensed substance almost resembling cartilage. The muscles give them the power of motion, and particularly that of forcibly seizing and compressing the food. This is especially necessary in the ox, because there are no upper front teeth, and for this purpose also the cartilaginous matter was added to them, and most of all to the upper lip. Simple muscular substance would be too yielding to retain the grass, when it was to be forcibly separated from the stalk or root. On account of this peculiar function of the upper lip of the ox, it is wider and flatter than that of the horse, in order that it may be brought better into contact with the herbage, and gathered in sufficient quantities.

Being so much employed for this purpose, there is a want of feeling about the lips of cattle very different from the acute sensitiveness of those parts in the horse. The ox is seldom used for the saddle. The Nagore oxen, described p. 268, are sometimes ridden, but their pace is slow and steady, and they are guided by reins perforating the septum of the nose. The damsels in the Mandara valleys, (p. 5,) when they ride to market in all their finery, and contrive to torture their horned palfreys into something like caperings and curvetings, also effect their purpose by means of a leathern thong passed through the cartilage of the nose.* The ox is not required to be alive, as it were, to the slightest motion of his driver or rider, and to anticipate his very thoughts; but his muzzle is to be continually in contact with the ground, among smooth and rough herbage—things pleasing and annoying; and therefore all acute feeling is withheld from him, and, consequently, he is rarely seen using his lips as substitutes for hands, and forming his opinion of the objects around him by the indications which they afford him, as we continually observe in the horse. There can be scarcely greater difference than in the habits of these two animals in this respect.

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* The Chili coachman, when he starts his six-in-hand team, guides his oxen in the same manner, but he has a singular way of getting them along:—' A thin pole, about five feet long, projected horizontally, is lashed to the roof of the cart, having at its extremity a grooved hole, through which the string passes: a goad is made of a hollow cane,

The excess of glandular substance in the lips of the ox is easily accounted for. They must not only afford their share of the natural moisture of the mouth, but they are, from their situation, form, and use, exposed to various nuisances. Insects will be continually crawling about the muzzle, and dirt and gravel will accumulate on it. If the grass is to be firmly held between the pad in the upper jaw and the teeth in the lower, and the upper lip must materially assist in the firmness of the grip, it must of necessity be continually in absolute contact with the ground, and cannot always be in the cleanest state. Nature has given the best of all defences against this. The outer covering of the upper lip is thickly studded with glands, and a fluid can be seen pouring out from them. If an ox, standing and ruminating, is watched, drops as clear as crystal are seen coursing one another down his muzzle, and falling on the ground. The upper lip, in health, is always wet; the insect cannot then fasten, and dirt cannot accumulate; or if the one should adhere, or the other begin to collect, the long tongue of the beast is protruded, it passes over the moistened surface, and all is clear again.

We take considerable notice of the secretion from these glands when we endeavour to form some judgment of the health of the animal, and the degree of disease. While the muzzle is moist, *i. e.*, while the natural secretions are going forward, there is no great constitutional disturbance, and consequently no great danger; in proportion as that secretion is lessened, there is general sympathy with some local affection; and when it becomes altogether suspended, it is an indication of so much universal derangement, that it behoves us to look about us. There is nothing more in this secretion than in any other, but it is one which is easily observed, and the changes in which can be accurately marked.

THE MEMBRANE OF THE MOUTH.

This is thin and delicate, compared with the external integument. Every part of the mouth is lined with it, and it contains numerous glands, occasionally rising into little papillæ, from which a considerable portion of the usual moisture of the mouth is derived. The gums and the bars are covered by this membrane, but they are denser and less sensible.

forty feet long, the butt-end being about four inches in diameter, while the smaller runs tapering to a point. The front end is generally made of a piece of willow, secured to the end of the cane, and is armed at the tip with an iron point, neatly and curiously lashed on by strips of horse-hide. This goad is hung in a kind of inverted stirrup attached to the end of the before-mentioned string, by pulling of which the driver, as he sits in the cart, can elevate or depress at his pleasure the stirrup which serves as the fulcrum of his goad, and supports it nearly in equilibrio, as the thick butt-end counterbalances the lighter longer end tending forward: thus suspended, the point can easily be thrust forward or sideway, so as to goad the haunches of the forward yoke of oxen: about five feet from the extremity, another small goad, armed with iron, hangs pendent by a string, so that by giving the cane a sideway motion, and lifting the butt end, the point can be dexterously directed, at the pleasure of the driver, upon the haunches of the second pair of oxen; a short lance held in his hand serves to goad forward the shaft-yoke.'—*Muir's Travels in Chili and La Plata*, vol. i. p. 244.

THE BARS.

These consist of a firm substance of a cartilaginous nature, adhering to the bones of the roof of the mouth, by numerous little cords, penetrating into these bones. They are thus hard and adherent, that the food may be rolled against the palate, and formed into proper masses for swallowing, whether in the first or second mastication. The palate is divided into numerous ridges running across the mouth, and on the posterior edge of which there is a fringed border, consisting of papillæ of no little consistence and strength, and all pointing backward; so that the food is permitted to travel backward, in this process of formation into pellets, but cannot again get into the fore part of the mouth.

THE PAD ON THE ANTERIOR MAXILLARY BONE.

These bars are flatter, harder, and more irregular in the ox than in the horse, and these papillæ at the edges of the bars are very considerably stronger. The bars thicken towards the fore part of the mouth, and there they accumulate into a pad, or cushion, which covers the convex extremity of the anterior maxillary bone. This pad is of a somewhat more fibrous and elastic nature than the bars, and stands in the place of upper incisor or cutting teeth. The grass is collected and rolled together by means of the long and moveable tongue; it is firmly held between the lower cutting-teeth, and the pad, the cartilaginous upper lip assisting in this; and then by a sudden nodding motion of the head, in which the pterigoid muscles are the chief agents, the little roll of herbage is either torn or cut off, or partly both torn and cut.

The intention of this singular method of gathering the food, it is somewhat difficult satisfactorily to explain. It is peculiar to ruminants, who have one large stomach, in which the food is kept as a kind of reservoir until it is ready for the action of the other stomachs. While it is kept there it is in a state of maceration; it is exposed to the united influence of moisture and warmth, and the consequence of this is, that a species of decomposition sometimes commences, and a vast deal of gas is extricated.

That this should not take place in the natural process of retention and maceration, nature possibly established this mechanism for the first gathering of the food. It is impossible that half of that which is thus procured can be fairly cut through; part will be torn, and no little portion will be torn up by the roots. If cattle are observed while they are grazing, it will be seen that many a root mingles with the blades of grass; and these roots have sometimes no inconsiderable quantity of earth about them. The beast, however, seems not to regard this; he eats on, dirt and all, until his paunch is filled.

It was designed that this earth should be gathered and swallowed. It was the meaning of this mechanism. A portion of absorbent earth is found in every soil, sufficient not only to prevent the evil that would result from occasional decomposition, by neutralizing the acid principle as rapidly as it is evolved; but perhaps, by its presence, preventing that decomposition from taking place. Hence the eagerness with which stall-fed cattle, who have not the opportunity of plucking up the roots of grass, evince for mould. It is seldom that a cow will pass a newly-raised molehill without muzzling into it, and devouring a considerable portion of it. This is particularly the case when there is any degree of indigestion. The mould here is comminuted to the greatest degree, and probably possesses peculiar freshness. When describing the Kyntore ox, at page 104, we remarked that he always had a basket of earth standing by him, of which he occasionally ate a considerable quantity, and which operated as a gentle purgative. When decomposition commenced, and the acescent principle began to be developed, and the animal felt uneasiness on that account, he had recourse to the mould; and the acid uniting itself to the earth, the uneasy feeling was relieved, and a purgative neutral salt was manufactured in the paunch.

THE TEETH.

The mouth likewise contains the principal agents in mastication, the teeth. The mouth of the ox when full contains thirty-two teeth; eight incisors in the lower jaw, and three molars in each jaw above, and below, and on either side. The incisor teeth are admirably adapted to perform their function. If there are no corresponding ones opposed, but merely an elastic pad, they must possess an edge of considerable sharpness in order to perform this half-cutting, half-tearing process. With a blunt edge there could be no cutting at all in such a case; but all the grass would be torn up by the roots, and the pasture destroyed, and the animal overdone, absolutely choaked with this absorbent earth. The part of the tooth above the gum is covered with enamel both to produce and retain this necessary sharpness. The crown of the tooth, or that part of it which is above the gum, presents a surface somewhat convex externally, but rising straight from the gum, while towards the mouth, it has a concave face, diminishing gradually in thickness as it recedes from the gum, and terminating in an edge, than which in the young animal few scissors are sharper. The elastic nature of the pad preserves it from laceration; but the less elastic substance interposed, the grass on which the animal is browsing, is partly cut through.

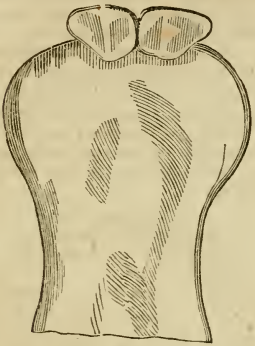
The molar teeth are as well adapted for the mingled laceration and grinding of the grassy fibres which are submitted to their action. Instead of the flat and somewhat uneven and roughened surface of the molars of the horse, presenting proper millstones for the grinding of corn, or dried and hardened fibre, there are two oblique surfaces, those on the lower jaw taking a direction upwards and from without, inwards, and those in the upper jaw slanting in an opposite direction, while the upper surface of the tooth is sawn into deep grooves. There are three in the last molar, the edges of which, from cones of enamel sunk deep into the substance of the tooth, are as sharp as knives, and cannot be roughly meddled with without laceration, and these receive corresponding projecting portions from the opposite teeth. From the prolonged, although leisurely action of machines like these, it happens that the food is reduced to a state of extreme comminution, in order that every particle of nourishment may be extracted from it. The horse requires only that portion of nutriment, which is easily extracted and for the purpose of present exertion; and his dung is more than half composed of vegetable fibres; the ox, on whose flesh we subsist, must extract every particle of matter which the food contains, and therefore not a fibre is seen in the fæces. The dung of the first is excellent for manure; that of the second, except it be a stall-fed beast, is comparatively of little worth.

THE AGE OF CATTLE AS INDICATED BY THE TEETH.

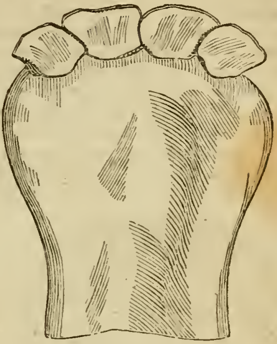
When describing the horns of cattle (p. 279,) we spoke of the usual and incorrect method of estimating their age by the horns. Far surer marks are presented in the teeth, and where there can be little deception from the frauds of dealers; for their interest would generally lead them to give a more youthful appearance than nature has allowed.

The mouth of the new-born calf presents an uncertain appearance, depending on the mother having exceeded or fallen short of the average period of utero-gestation. Sometimes there will no be vestige of teeth, but generally, either two central incisors will be protruding through the gums, or they will have arisen and attained considerable bulk.

About the middle or close of the second week a tooth will be added on either side, making four incisors.

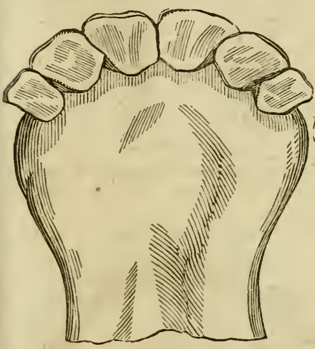


Birth.

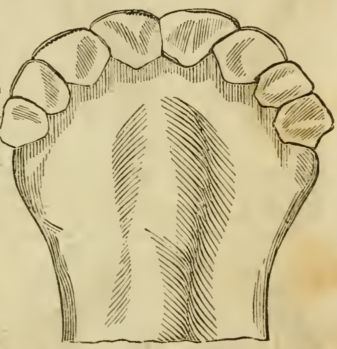


Second week.

At the expiration of the third week the animal will have six temporary incisors or front teeth.



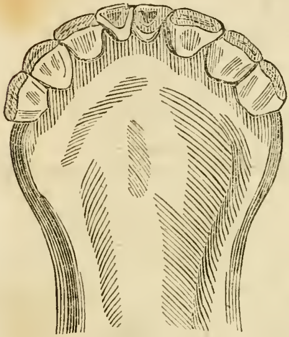
Third week.

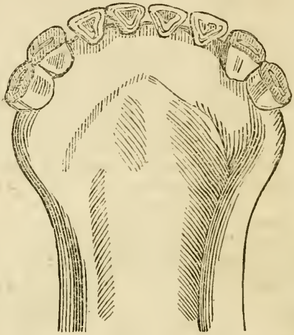


Month.

At a month, the full number of the incisors will have appeared. These are the temporary or milk teeth. The enamel will be seen covering the whole of the crown of the tooth, but not entering into its composition as in the horse, and it will be observed that the edge is exceedingly sharp. The only indication of increasing age will be the wearing down of these sharp edges, and the appearance of the bony substance of the tooth beneath. The two corner teeth will be scarcely up before the centre teeth will be a little worn. At two months, the edge of the four central teeth will be evidently worn; yet as the wearing is not across the top of the tooth, but a very little out of the line of its inner surface, the edge will remain nearly or quite as sharp as before. At three months the six central teeth, and at four months the whole set will be worn, and the central ones most of all; but after the second or third month, *the edge* of the tooth will begin to wear down, and there will be more of a flat surface with a broad line in the centre.

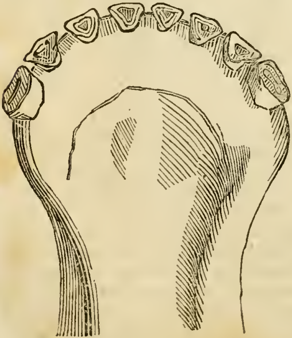
About this time a new change will begin, but very slowly to be seen. The central teeth will not only be worn down on their edges, but the whole of the tooth will appear diminished, a kind of absorption will have commenced. There will be a little but increasing space between them. The face of the tooth will likewise be altered, the inner edge will be worn down more than the outer, and the mark will change from the appearance of a broad line to a triangular shape. The commencement of this alternation of form and diminution of size may be traced to about the fourth month, and our cut gives a representation of the two central incisors at eight months. The central teeth are now not above half the size of the next pair, and they are evidently lessened.

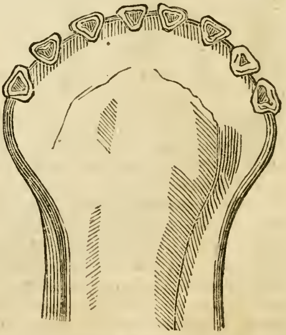

Eight months.


Eleven months.

At eleven months the process of diminution will have extended to the four central teeth in the manner represented in the cut. The vacuities between them, will now be evident enough.

This cut gives the mouth of a young steer fifteen months old.


Fifteen months.


Eighteen months.

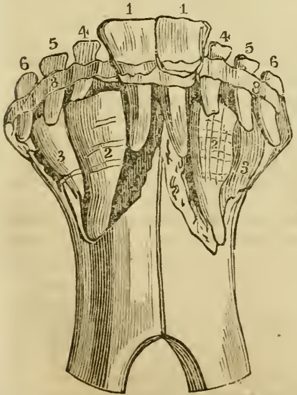
The last cut presented us with the curious and diminutive appearance of all the incisors in a bullock eighteen months old. It would appear difficult for him to obtain sufficient food to support himself in good condition. It is somewhat so, and it may be in a great measure owing to these changes in the teeth, and the difficulty of grazing, that young beasts are subject to so many disorders from seven or eight months and upwards, and are so often out of condition. They contrive, however, to make up for this temporary disadvantage by diligence in feeding; and, to allude for a moment to another animal, we have known many, not only a broken-mouthed, but a toothless ewe thrive as well as any of the flock, for she was grazing all the day, and ruminating all night.

At this time, eighteen months old, the corner teeth will not be more than half their natural size; the centre ones will be yet more diminished; and, as the cut very faithfully represents, the vacuities between them will be almost equal to the width of the teeth. The faces of the teeth also, such faces as remain, will be lengthened; the triangular mark will diminish, and principally in the central teeth; while another, more or less deeply shaded, will begin to appear around the original mark.

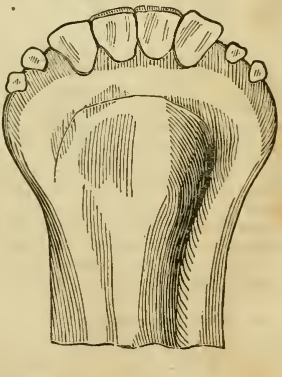
All this while, the second set of teeth, the permanent ones, have been growing in their sockets, and approaching towards the gums; but not as is said to be generally the case with other animals, and with the human being in particular, pressing upon the roots of the milk teeth, and causing them to be absorbed, until, at length, losing all hold in the socket, they fall out. The process of absorption commences here in the whole milk-tooth, and as much in the crown or body of it as at its root.

The process of general diminution seems now for awhile retarded; it is confined to the central teeth, and they gradually waste away until they are no larger in the body than crow-quills. About the expiration of the second year, or a little before, the milk teeth are pushed out or give way, and the two central permanent teeth appear.

This cut gives the mouth of a two-year old beast, the two permanent central incisors are coming up, and the other six milk teeth remain. The bone in front of the lower jaw is taken away, in order that the alveoli, or



Two Years.

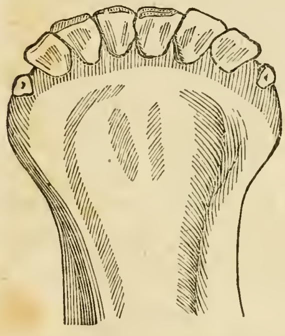


Three Years.

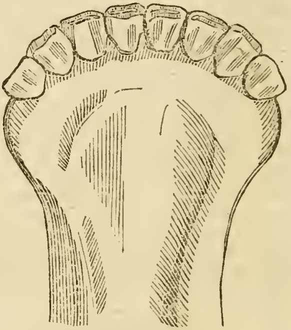
cells for the teeth, may be exposed. The second pair of incisors have almost attained their proper size, but have not assumed their proper form. The third pair are getting ready, but the jaw is not yet sufficiently widened for the development of the fourth pair.

The process of absorption will still be suspended with regard to the two outside pairs of milk teeth, but will be rapid with regard to the second pair, and a little before the commencement of the third year they will disappear. This cut represents the three-year old beast, with four permanent incisors and four milk teeth.

Now the remaining milk teeth will diminish very fast, but they show no disposition to give way, and at four-years old there will be six permanent incisors, and often apparently no milk teeth, but if the mouth is examined, the tooth that should have disappeared, and the tooth that is to remain until the next year, are huddled together and concealed behind the new permanent tooth. They are often a source of annoyance to the animal; and the tooth whose turn it was to go must be drawn. The four-year-old mouth then, as represented in this cut, should contain six permanent incisors and two milk teeth.



Four Years.



Five Years.

At the commencement of the fifth year the eight permanent incisors will be up; but the corner ones will be small. This cut gives a five-year old mouth, or perhaps one a month or two after five years; so that the beast cannot be said to be *full-mouthed*, i. e., all the incisors fully up, until it is six years old. It will be seen, however, in this mouth of five years, that the two central pairs are beginning to be worn down at the edges, and that in a flat direction, or somewhat inclining towards the inside.

At six-years old, the teeth are all fully grown, but this mark has extended over the whole set, and all the teeth are a little flattened at the top; while on the two centre ones there begins to be a distinct darker line in the middle, bounded by a line of harder bone.*

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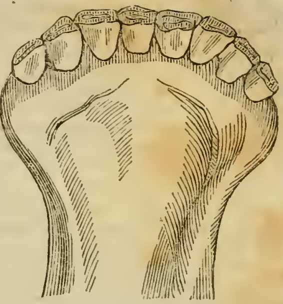
* We are perfectly aware against what authority we are contending when we thus compute the age of cattle by the appearance of the teeth. The pleasing author of the 'Illustrations of Natural History' gives the beast a full mouth at three years old, and so does Buffon and the editor of the Encyclopædia Metropolitana. Mr. Parkinson says that the mouth is full at four, although he acknowledges that the teeth are not perfectly up until the animal is six years old. We have no hesitation, however, in appealing to the experience of the breeders of cattle, for the general accuracy of our account.

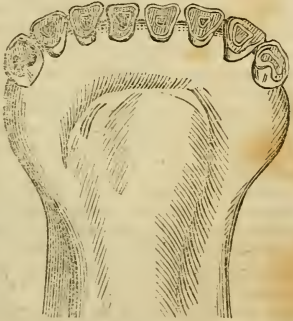
From this time the age can only be guessed at, and not decidedly affirmed; and a great deal will depend upon the manner in which the animal is fed. The beast that is most out, and that is compelled most to use his incisor teeth, will have them worn farthest down. Perhaps, as a general rule, but admitting of many an exception, it may be said that, at seven years old, this line is becoming broadest and more irregular in all of the teeth; and that a second and broader, and more circular mark appears within the centre of the former one, and most distinct in the central, or two central pairs—and which at eight years, has spread over the six central incisors.


Six Years.

A year afterwards, however, a change takes place which cannot be mistaken. The process of absorption has again commenced, and precisely where it did when the animal was four months old, viz., in the central incisors; but it is slow in its progress, and it is never carried to the extent to which we observed it in the milk teeth. It is, however, sufficiently plain, and the two central teeth are evidently smaller than their neighbours. A considerable change has also taken place on the surface of the teeth; the two dark marks are rubbed into one in all but the corner teeth.

At ten, the four central incisors are diminished in size, and the mark is becoming smaller and fainter. The cut represents the mouth at this age.

At eleven, the six central ones are smaller; and at twelve, all of them are very considerably diminished; but not, as we have already observed, to the same extent as in the young beast. The mark is now also faint, or nearly obliterated, except in the corner teeth, and the inside edge is worn down to the gum.


Ten Years.

The beast is now getting old; the teeth continue to diminish, and it is not often that the animal, after fourteen or sixteen years old, is able to maintain his full condition. He must then be taken up and partly fed in the house: yet there are many instances in which favourite bulls have been kept until they were more than twenty years old; and we know a cow of the same age who pastures with the rest of the dairy, and gives a fair quantity of milk.

Some writers have asserted, that a good cow will usually continue good until that age; but the dairyman would discover his error, both in the quantity and the quality of his milk, if he received it as a general rule, that a good cow will continue to breed and give milk until twenty years old. Mr. Watkinson, however, had a cow that for seventeen years gave him from ten to twenty quarts of milk every day; was in moderate condition when taken up; six months in fattening; and, being then twenty years old, was sold for more than 18*l*. Mr. John Holt, of Walton, in Lancashire, had a healthy cow-calf presented to him, whose dam was in her thirty-second year, and could not be said to have been properly out of milk for the preceding fifteen years.

This method, then, of judging of the age of cattle by the teeth, is more satisfactory than by the horns, and little of the imposition can be practised to which the buyer is sometimes exposed, whether the animal is young or old. It is true, that from six to nine we can only guess at the age; but we can form a shrewd guess, and can scarcely be out more than a few months.

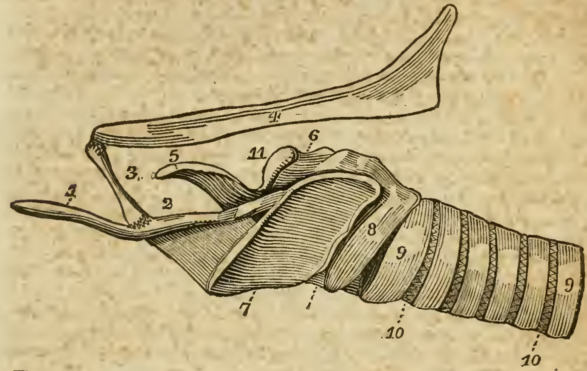
With regard to the horn we are subject to imposition at all times; we are obliged to ask questions as to the first calf; and, when the animal gets old, the supposed rings often present a mass of confusion of which the best judges can make nothing.

The grinders will rarely be examined to ascertain the age of a beast. They are too difficult to be got at; and the same dependence cannot be placed upon them. The calf is generally born with two molar teeth, and sometimes with three in each jaw above and below. The fourth appears about the expiration of the eighth month, and the fifth at the end of the year, about which time the first molar is shed. The second is displaced at the end of the second year, and so with the rest, at intervals of a year; but the sixth molar, which is from the beginning a permanent tooth, does not appear until the sixth year.

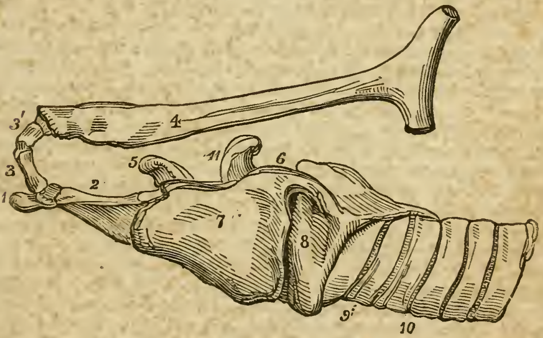
THE TONGUE.

The tongue occupies the base of the mouth. It is firmly held in its situation by muscles principally derived from the os hyoides, a singular bone common to it and to the larynx. It is composed of the union of these muscles, which extend their fibres through every part of it, and with which is intermingled a considerable quantity of fatty matter, which gives to the tongue its peculiar taste and appearance when cut into. It is covered by the membrane of the mouth, but curiously modified; it resembles more the cuticle or scarf-skin, but the internal layer is fibrous and sensitive, and between the two is a soft, reticulated substance which serves as a bed for the papillæ, or little eminences scattered all over the tongue, some of which, at least, are supposed to be the terminations of the gustatory nerve, or that branch of the fifth pair on which the sense of taste depends. The use of the tongue, generally, is to dispose of the food between the grinders during mastication; to collect it afterwards, and, by the assistance of the bars, form it into a pellet for swallowing: it is also the main instrument in drinking, and the canal through which the fluid passes in the act of drinking. The outer covering of the tongue of the ox possesses a hardness and roughness not found on that of the horse. The peculiar way in which the food is gathered renders this necessary; and while the horse expresses his friendship for his companion by nibbling him with his teeth, two cows will rub and rasp each other with their tongues for an hour or two at a time.

In the ox, however, it answers other purposes; it helps to collect the grass together and form it into a roll before it is brought between the pad of the upper jaw and the incisor teeth of the lower one; it serves to clean the muzzle from annoyances to which it is exposed by means of dirt or insects; and it likewise wipes from the nostril the filth that is discharged from it in various diseases of the membrane of the nose or the air passages, to which the ox is so subject. The mouth is shorter than that of the horse: the tongue, as it lies in the mouth, is shorter, and yet it is able to discharge all those functions, which are only imperfectly performed and some of them cannot be performed at all, by the tongue of the horse. The following cuts will explain this:—



1. The spur.
2. The basis, or greater cornu or horn.
3. The inferior lateral cornu.
4. The superior lateral cornu.
5. The epiglottis.
6. The arytænöid cartilage.
7. The thyröid cartilage.
8. The cricoid cartilage.
9. The Rings of the trachea.
10. The interposed ligamentous substance between the rings.
11. The Rimæ glottidis.



1. The spur.
2. The basis, or greater cornu or horn.
3. The inferior lateral cornu.

3′. The middle cornu.

4. The superior lateral cornu.
5. The epiglottis.
6. The arytænöid cartilage.
7. The thyröid cartilage.
8. The cricöid cartilage.
9. Rings of the trachea.
10. The interposed ligamentous substance between the rings.
11. The Rimæ glottidis, or entrance into the windpipe.

Of the support which the os hyoides, resembling the Greek letter *upsilon*, gives to the larynx, and its connexion with all the motions of that autiful cartilaginous box in the common function of breathing, or in the production of the voice, and also in the contractions of the pharynx, we shall treat hereafter. We have now to do with the tongue. The reader will remark the spur projecting from the centre of the body of this bone in the horse, *fig.* 1. It is from two to three inches in extent, and it penetrates deeply into the root and body of the tongue; and from its sides, roughened for the purpose, there spring, through the whole extent of the bone, powerful muscles, (the *genio-hyo-glossi* muscles, belonging to the chin, the hyoid bone and the tongue,) whose object is to draw down the tongue within the mouth, and limit its action.

Why this in addition to muscles likewise confining the tongue which are common to other animals? Why this in the horse alone, at least to any thing like the same extent? Because he was designed to be subjected to the government of the bit. Because he was to be ridden and driven at our pleasure. A tongue of considerable, or of loose motion, would be an inconvenience to him. Under the unequal pressure of the bit, it would roll from one side to the other, and be excoriated or lacerated by the teeth. But thus tied down by the spur, or appendix of the hyoid bone, it forms a useful pad on which the bit may rest, and on which it may be worked. Without this contrivance the jaw, which even now is too often brutally injured by the bit, would be exposed to yet more frequent and severe mischief, and, therefore, the tongue of the horse is thus confined. We rarely see the tongue of the horse protruded from his mouth, except he has acquired the trick of licking his manger.

There is nothing about the ox which requires this confinement of the tongue; but, on the contrary, he has need of one possessing an extraordinary freedom of motion. Look at the os hyoides of the ox. Its spur (I. p. 325) is reduced to a mere tubercle. There is no penetration or confinement of the root of the tongue. The same muscles spring from it as from the spur of the hyoid bone of the horse, but they are diminutive and weak, and have little or no power over the body of the tongue.

Look again at the construction of the hyoid bone. The muscle which, next to that which belongs to the spur, influences the motions of the tongue, has its origin from, or is attached to, the cornu of the bone near the spur. There are two joints connecting the cornu with the body of the bone, in order to give a certain freedom of action to the bone, but the extremity of the cornu is tied down to the temporal bone by a strong cartilage. In the hyoid bone of the ox, the muscle (the *hyo-glossus-longus*, the long muscle belonging to the hyoid bone and the tongue) has the same origin and attachment; but there is an additional joint to give greater freedom of motion, and not only so, but the bifurcation of the superior lateral cornu, swelled out into a head or tubercle, has lost its unyielding cartilaginous attachment to the temporal bone, and is fitted into a curious socket, formed between the mastoid process of the temporal bone, and a plate of bone let down on purpose, and in which it plays loosely, yet securely. These are points of comparative anatomy which the physiologist will know how to value, and which will not be quite uninteresting to any one who loves to trace the marks of design in the various works of Him who made us all.

GLOSS-ANTHRAX OR BLAIN.

There is a disease of the tongue in cattle, which, from its sudden attack, its fearful progress, and its frequently fatal termination, requires particular notice. The animal is dull, refuses his food, and rumination ceases. A discharge of saliva appears from the mouth; it is at first limpid and inoffensive, but it soon becomes purulent, bloody, and exceedingly fœtid;

the head and the neck begin to swell; they become enormously enlarged; the respiratory passages are obstructed; the animal breathes with the greatest difficulty, and is, in some cases, literally suffocated. This is the Blain or Gloss-anthrax—inflammation of the tongue.

On examination of the mouth, the tongue is apparently enlarged, but it is, in fact, only elevated from its bed between the maxillary bones; and the cause of this being examined into, large vesicles or bladders, red, livid, or purple, are found running along the side and base of the tongue, and particularly towards its anterior part. These bladders are strangely rapid in their growth; they become of a great size; they quickly break; and they form deep ulcerations. Other vesicles immediately arise in their immediate neighbourhood, of a similar character, but of a still larger size Sometimes the animal dies in twenty-four hours from the first attack; but at other times fever rapidly succeeds of a typhoid or malignant kind. In a few cases these bladders have been found on the upper part of the tongue, and even nearer to the top of it than to the frænum. The tongue soon becomes really enlarged, and particularly when the lateral or inferior parts of it are the seats of disease. General inflammation of it speedily follows, and that part of it on which the ulcers first appeared, becomes mortified, and may be cut into, or cut away, without the animal expressing the least degree of pain. Incisions into the tongue are not followed by blood, but they bring to view tissues decomposed at some points, and black at others, and bearing the marks of incipient gangrene.

The primary seat of the disease is the membrane of the mouth beneath or above the tongue. As the sublingual glands lie along the under part of the tongue, and their ducts open on the side of the membrane or ligament under the tongue, it is possible that this disease may proceed from, or be connected with, obstructions or inflammation of these ducts. Dissection, however, has not proved this, but the membrane at the base of the mouth seems to be the part primarily concerned.

Post mortem examination shows intense inflammation, or even gangrene of the part and also inflammation and gangrene of the œsophagus, the paunch and the fourth stomach. The food in the paunch has a most offensive smell; and that in the manyplus is hard and dry. Inflammation reaches to the small intestines, which are highly inflamed, with red and black patches in the cœcum, colon, and rectum. We cannot speak with confidence as to the cause of this disease; indeed, we believe it is, in a great majority of cases, unknown. Some have said that it is more frequent in low, marshy lands than in others; that it attacks beasts that have been in poor condition, and are suddenly changed to good pasture: and that it oftener happens in spring and autumn than in the summer or winter.

We have considerable doubt about this, for we have seen it at all seasons, and under all circumstances;—in the stall-fed cows of the metropolis, whether newly bought, or those that are used to their situation and in the grazing pastures of the country. When it becomes epidemic—when many cases occur about the same time, and over a considerable extent of country, and in the town dairies as well as the country ones, it is usually in the spring or autumn. Most epidemics of an inflammatory character occur at those periods, for the process of moulting is then going forward, and the animals are, to a certain degree, debilitated, and disposed to inflammatory complaints; and these assume a low and typhoid, and then a malignant, form, much oftener and much more speedily in cattle than in other domesticated animals. Our friend, Mr. Sewell, of Brighton, speaking of this disease, and of the prostration of strength by which it is frequently accompanied, says, that 'there appears to be a deficiency of courage and nervous energy in cattle, compared with the horse, and a consequent inability to contend with disease.' It is a very judicious remark, and affords a key to the progress and treatment of many of the maladies to which these animals are subject.

Hurtrel d'Arboval, under the title 'GLOSS-ANTHRAX,' in his valuable 'Dictionary of Veterinary Medicine and Surgery,' gives a fearful list of the numerous times that it had appeared as an epidemic on the continent. If we owe nothing more to the establishment of veterinary schools, about the middle of the last century, we are at least indebted to them for the disappearance of these epidemics, or their being deprived of their murderous character. The truth is, that these epidemics, although dependent on, and produced by, some atmospheric agency, required a predisposition in the animal to be afflicted by the disease; that predisposition was the result of the injudicious treatment of cattle which then prevailed. That treatment was improved by the suggestions of veterinary men, and then, although the agent remained, the predisposition was removed, and the epidemic ceased. It is singular, however, that although this is too plain to be denied, the breeders of cattle have little to do with veterinary men—they prefer their own antiquated recipes, or they have recourse to the blacksmith, or the uneducated cow-leech, and some veterinary schools kicking down the ladder by which they climbed to a certain degree of reputation, have abandoned the study of the diseases of cattle—so curiously do extremes occasionally meet.

While the blain sometimes assumes an epidemic character, we fear that there can be no doubt of its being *contagious*, and especially under the malignant form. The disease, however, like glanders, in the horse, is not communicated by the breath; but there must be actual contact. The beast must eat from the same manger, or drink from the same trough, or be in such a situation that the saliva, in which the virus seems to reside, shall be received on some abraded or mucous surface. The malady is readily and too frequently communicated when animals graze in the same pasture. The farmer and the practitioner should be aware of this, and should adopt every necessary precaution.

We fear that we are justified in stating, that this is one of the maladies which may be communicated from the brute to the human subject, and the list of these is fearfully increasing. We are unwilling to excite unfounded fear, and we do not believe half the stories that are told us of herdsmen that have attended on cattle suffering under the blain, and becoming afflicted with a similar disease; but there are several accounts which are too well authenticated to be for a moment disputed. We relate one—A man held down the tongue of an ox with a silver spoon, in order to examine the mouth, which had many of the characteristic vesicles. He afterwards and without any great care about cleaning it, ate some broth with the same spoon. Not many days had elapsed, when his mouth felt sore, pustules appeared on the side of the tongue, malignant fever succeeded, and he died. When this disease raged at Nismes, in 1731, it was communicated, not only to the human being, but to various species of domesticated animals. The appearance of this epidemic was strangely accounted for. It prevailed in the autumn, after an exceedingly dry summer, and when the beasts, all the grass being burned up, were compelled to feed upon the leaves of the trees covered with snails. The danger, however, so far as it can be ascertained, is trifling, and easily avoided; and a man may attend on a hundred of these animals without injury: *he has to take care that the saliva or discharge from the mouth does not touch any sore place* *or lodge upon the lips;* and if he should fear that it may have come into contact with any little wound or sore, he has only to apply the lunar caustic lightly over the part, and there will be an end of the matter.

The treatment of blain is very simple; and, if adopted in an early period of the disease, effectual in a great majority of cases. Blain is, at first, a local malady, and the first and most important means to be adopted will be of a local character. It is inflammation of the membrane of the mouth along the side of, and under the tongue, and characterized by the appearance of vesicles or bladder; perhaps pellucid at first, but becoming red or livid, as the disease advances; *These vesicles must be freely lanced from end to end.*

In some parts of the south of Scotland, the farmers, and the practitioners, too, are anxious that the bladder should be carefully taken away with a piece of cloth after it has been thus lanced, and especially that the yellowish fluid which it contains should be removed; the swallowing of which is considered to be very dangerous. There is no necessity for this; it is quite sufficient if the vesicle is freely lanced. There will not be much immediate discharge; the bladder was distended by a substance imperfectly organized, or of such a glairy or inspissated nature as not readily to escape. If this operation is performed when the saliva first begins to run from the mouth, and before there is any unpleasant smell or gangrenous appearance, it will usually effect a perfect cure.* If the mouth is examined four-and-twenty hours afterwards, the only vestige of the disease will be an incision, not looking very healthy at first, but that will soon become so and heal.

Some rub a little salt well into the incision as soon as it is made, and others apply a solution of alum. Either may be done, and the first is preferable, if the owner should appear to wish that something of the kind should be attempted, but neither of them is necessary. If the disease has made considerable progress, and the vesicles begin to have a livid appearance, or perhaps some of them have broken, and the smell is becoming very offensive, the mouth must be carefully examined, and any vesicles still remaining whole, or new ones beginning to rise, must be deeply and effectually lanced, and the ulcers washed half-a-dozen times in the day, or oftener, with a diluted solution of the chloride of lime (a drachm of the powder to a pint of water.) By means of a syringe or piece of sponge, this may be brought into contact with every part of the ulcerated surface.

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* It is agreed, on all hands, that these vesicles must be opened. The free use of the lancet seems to us to be the most simple and effective method of opening them; Mr. Parkinson, however, whom we have often quoted with respect as a breeder, and a judge of cattle, recommends the following injudicious and dangerous method. We should not allude to it, had we not reason to believe that, on the faith of his name, it has been too frequently practised. He says, 'Breeding and Management of Live Stock,' vol. i., p. 234, 'provide a cane or stick that will bend, long enough to reach into the great bag, or stomach, of the animal; then take a piece of soft woollen cloth, or linen, but flannel is the best, put into it some tow, soft hay, cotton, or wool, to the size of an egg, or a little larger, and tie it on the end of the stick, this being done, dip it in tar, and open the mouth of the animal; with one hand take hold of the tongue, while with the other hand you gently thrust the stick with the tar upon it down the throat into the stomach, there let it remain for about half a minute for the tar to dissolve and disperse, then draw it very gently up, the slower the better, as wind will follow, which, in some cases, gives great ease. Repeat this three times, and the animal will he immediately relieved.'

Now for the rationale of all this: the effect to be produced, and on an animal already scarcely able to breathe—distressed by the increased respiration produced by the slightest motion, and in fact threatened with absolute suffocation every moment. 'The immediate efficacy of the medicine, I apprehend, arises from thrusting the stick, or cane, down the throat, *which breaks the bladders*, and it is for that reason I prefer flannel to linen as more likely, in passing the root of the tongue, to have that effect; while the tar being nauseous, causes the animal to throw up a large quantity of thick saliva, coughing and sneezing violently.'

We quote this passage not only to protest against a mode of treatment far more likely to kill than to cure; but also to show the deplorable state of cattle medicine, when one of the best of our authors on the breeding and management of live stock, and a practical man too, can write thus ridiculously.

In a very short time the unpleasant smell will diminish or cease, and the ulcers will begin to assume a more healthy character. When all fœtor is removed, the mouth should be bathed with a lotion composed of equal parts of tincture of myrrh and water, or a pretty strong solution of alum, to which a fourth part of the tincture of catechu has been added.

This plan of treatment will also be usually successful if the ulceration has not assumed too much of a gangrenous character, and if symptomatic or low fever has not appeared in too intense a degree. These are very important circumstances, and should not be passed lightly over by the proprietor of cattle; for several of the most fatal diseases to which they are exposed, are of comparatively little importance, and easily got rid of in the early stage, and it is neglect that produces all the danger. It does so here; for the blain, although easily cured when attacked in its early state, becomes uniformly fatal if neglected. We do not, however, mean to say that, in these early stages of the blain, the disease should be always so simply treated, and that the mere lancing of the vesicles should be the only means adopted; but it should be the first thing done, and that on which we place the greatest dependence, as attacking the fountain-head of all the after mischief, and getting rid of the danger of suffocation at least.

The blain, suffered to take its course, speedily becomes connected with fever, and that fever is not long in taking on a typhoid form; even then we should certainly abstract blood. Four, or five, or six quarts should be taken away according to the size of the beast, and the urgency of the case; or, rather, we should bleed until we begin to perceive its effect on the general circulation.

In addition to this, as constipation usually accompanies the commencement of fever, and is never absent in cases of blain, we should administer a purgative—from a pound to a pound and a half of Epsom salts; and we should likewise throw up some laxative injections.

We take this opportunity, when treating on one of the first serious disorders of cattle, to protest against the unscientific, inefficient, beastly method of administering purgatives, prevalent not only among the ignorant pretenders to the profession of foolish nostrums that are to be found in every village, but among farmers, and some of them of the better sort, and also among the lower class of practitioners. If a beast is to have a dose of physic, it is ordered to be dissolved in a quart of human urine; and if the drink is sent, and not given for a few days, its horrible stench betrays the menstruum. There is something abominably disgraceful in all this; and the man who hereafter recommends it deserves to be drenched with his own medicine. Let the Epsom, or Glauber's, salts, or the common culinary salt, be dissolved in simple water or thin gruel. They want nothing to ensure or increase their effect.

From the inveterate apathy and neglect of the farmer, the practitioner may not be called in until gangrenous ulcers fill the mouth, and the membrane of the mouth, and the tongue itself, seem to be sloughing away in pieces; ulcers, perhaps, have also begun to appear externally behind or under the jaw, and most of all to be dreaded, and frequently accompanying the worst stages of blain, ulcers begin to break out about the feet, and particularly at the junction of the hair and the hoof, and threaten the loss of the hoof.

What is the practitioner now to do? He must be more diligent in his local treatment. That invaluable disinfectant, the chloride of lime, must be used from morning to night, until the gangrenous character of the ulcers is changed; and then the tincture of aloes, or the tincture of myrrh may be substituted. The ulcers that may appear in any other part, and particularly about the feet, must undergo a similar treatment. Some have recommended the application of the cautery to the bottom of the ulcers, but there is no necessity for this. The chloride of lime, the solution being by degrees strengthened, will not only remove the fœtor, but usually give the ulcer a healthy surface.

No bleeding will be required here: the stage of acute fever is passed. Physic should be given—one dose at least, whatever is the state of the bowels, and even although the diarrhœa of typhoid fever should be established; but, at the same time, the system must be roused and supported. A double dose of aromatic powder should accompany the physic; and, after that, the gentian, calumbo, and ginger roots should be regularly administered in powder, suspended in gruel; the half-pint of strong home-brewed ale not being forgotten. Two drachms of gentian and calumbo, and one of ginger, will constitute an average dose, and may be repeated morning and night.

The practitioner should pay considerable attention to the food. It is not always that the appetite fails in this disease; nay, we have seen it, as in tetanus, remain unimpaired to the last; but the soreness of the mouth has prevented the animal from either eating or ruminating. He should be fed with gruel—some of it should always be within his reach, and he will occasionally sip no inconsiderable quantity of it. More should be poured down, or given by the stomach-pump—the latter being the better way of administering it. When poured down bodily from the horn, it will generally find its way into the rumen, and there it will be retained, and be in a manner lost; but when given from the small pipe of the pump, and not too strongly forced on, it will trickle down the gullet, and be likely to flow on into the fourth, or true digesting stomach, and be converted into immediate nutriment.

There is reason to hope that this is one of the somewhat numerous class of diseases, under which the animal either cannot labour a second time, or to which the constitution betrays an evident insusceptibilty for a considerable period. Cattle that have recovered from the blain have been afterwards purposely subjected to the danger of contagion, but without effect.

THRUSH IN THE MOUTH.

There is a disease, sometimes an epidemic, and especially in the spring and winter, when the weather is unusually cold and wet, that may be mistaken, and we believe has been so, for gloss-anthrax or blain. It consists in the appearance of pustules, or sometimes vesicles, not merely along the side, and at the root of the tongue, but all over the mouth, and occasionally even on the outside of the lips. These pustules break, and minute ulcers succeed, which may run a little into each other; but they oftener speedily heal. Some persons have taken to themselves a great deal of credit for the treatment of these supposed cases of blain.

This is a very harmless affair. There is sometimes a slight degree of fever, but rarely such as to interfere with the appetite, and never such as to indicate danger. The disease may last for ten days, or a fortnight, or more; but it gradually yields to a few mild doses of physic; and we have thought that the beast throve the better afterwards for having got rid of something that was oppressive to the constitution.

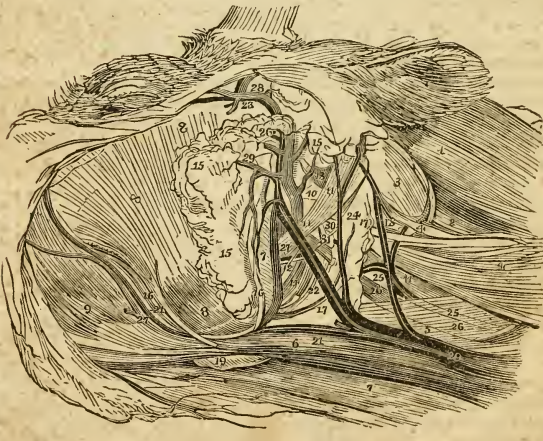
THE SALIVARY GLANDS.

The food, when first gathered, is rolled hastily into a pellet, and swallowed, without being mingled with much of the moisture of the mouth; but the second mastication is another affair—the food is not only to be thoroughly broken to pieces and ground down, but brought into that softened and pultaceous state, in which it can be thoroughly acted upon by the gastric juice, and the function of digestion performed. The mouth is furnished with various glands, which secrete a limpid fluid of a somewhat saline taste, and called the saliva, by which the food is thus softened. These are differently named, according to their situation.

The PAROTID GLAND, or the gland in the neighbourhood of the ear, is the largest and most important of them. It is not so large as in the horse, but it is of a redder colour, and, on that account perhaps, more subject to inflammation than the same gland in the horse. It occupies the hollow which extends from the root of the ear to the angle of the lower jaw. It consists of a vast number of little glands connected together by cellular tissue, each having its minute duct to convey away the fluid that is secreted, and these ducts communicating with one another, and joining together to form one main branch, termed the parotid duct, through which the united stream is conveyed into the mouth.

The following cut will give the reader a sufficient notion of the situation and connexions of this gland, and also of the blood-vessels of the neck, and principal muscles of the upper part of it. It may be compared with the cut (p. 119) in 'The Horse.'

1. The *splenius* (spleen-shaped) muscle occupying almost the whole of the upper and side part of the neck, and extending from the parietal ridge, as far down as the fourth and fifth vertebræ of the back. It arises in the ox by two tendons, one from the atlas, and the other from the mastoid process of the temporal bone: it is attached superiorly by tendinous and fleshy fibres to the ligament of the neck, and inferiorly by fleshy fibres to the transverse processes of the bones of the neck, and the fore-part of the spine. There is one muscle on each side of the neck. When they act together they erect



and support the head and neck; when either acts alone, it inclines the head and neck on that side. It is the muscle on which, with the *trapezius* in the next cut, the form of the upper part of the neck principally depends; and no one can be much acquainted with, or have admired, our best breeds of cattle, without observing that it is much thinner and smaller than in the horse, and has a direction less oblique.

2. The *inferior oblique* (taking an oblique direction.) A deeper-seated muscle on each side of the neck, from the first to the second bones of the neck.

3. The *superior oblique.* Likewise a deeper-seated muscle from the first bone of the neck to the portion of the parietal bone which forms the poll. Both acting together they elevate the head;—either, acting alone, turns it on that side. When the hand is passed down the side of the cervical ligament, even near to the poll, the muscles of the neck will be observed to become rapidly thicker. The thickness of the neck of the ox lies principally below; so it is in almost all ruminants, and particularly in the deer tribe; and therefore these muscles are considerably larger in the ox than in the horse.

4. A portion of the *levator humeri* (the elevator of the arm) reversed. This important muscle occupies the same situation in the ox as in the horse. It is seen in its proper place at *b*, p. 119, 'Horse.' It arises by an aponeurotic expansion from the parietal ridge, and by a strong tendon, from the mastoid process of the temporal bone, and from the four first bones of the neck, and, connecting itself with the ligament of the neck, it goes to the muscles of the shoulders and the upper bone of the arm. When the head is made a fixed point, one of them, acting alone, draws forward the shoulder and arm; when the shoulder is made the fixed point, it turns the head and neck; or, the shoulder still being the fixed point, and both acting, the head is depressed. This muscle is much larger in the ox than in the horse, and presents to the comparative anatomist and to the veterinary student some important points of difference. It is more decidedly united with the *rhomboideus longus* (the long rhomboid-shaped muscle) than in the horse, and evidently contributes materially to the formation of those sub-cutaneous muscular fibres, which are substituted for the proper sub-cutaneous muscle of the neck. Inferiorly it is divided into three branches —the one, thin and inferior, goes to the anterior extremity of the sternum; the second, at the inferior part of the arm, furnishes a tendon, which is inserted with that of the *pectoralis transversus* (the transverse muscle of the chest) into the humerus; while the superior division gives a strong tendinous expansion, which spreads over, and loses itself upon the outer face of the humerus. It may well, therefore, be a larger and more powerful muscle than in the horse.

5. The *sub-scapulo-hyoideus* (belonging to the substance underneath the shoulder, and to the hyoid bone,) from the shoulder-blade to the body of the hyoid bone, to draw backward that bone, considerably larger in the ox than in the horse.

6. *Sterno-maxillaris* (belonging to the sternum and the lower jaw,) from the cartilage in front of the chest to the angle of the lower jaw, considerably smaller than in the horse, but contrived to adapt itself to the peculiar wants of the animal. It is attached to the lower jaw by means of a bifurcated tendon, as beautifully shown in this cut. The posterior branch is inserted into the masseter muscle, on which it acts as a kind of bridle in the usual process of mastication, and more particularly as tending to limit the lateral and grinding motion of that muscle. The other goes on and attaches itself to the buccinator

muscle, immediately to be described. Thus they act quite as much as muscles of mastication, as they are concerned in the bending of the head and perhaps more so. The whole muscle may act on the head—the separate portions of it on the function of mastication.

7. The *sterno-hyoideus*, from the sternum to the hyoid bone, and to the thyroid cartilage of the larynx, in order to draw the bone and the cartilage downward and backward.

8. The *masseter* (masticating muscle) is far less developed than in the horse, but the fibres run more obliquely, and are shorter, and therefore do not lose so much in power as their want of volume would seem to indicate. It occupies nearly the same situation as in the horse, except that there is no projecting ridge of the malar bone. It covers the greater part of the side of the superior maxillary bone, and is inserted into the roughened surface of the angle of the lower jaw bone.

9. The *buccinator* (the muscle by which the human being blows the trumpet) extends from the alveolar borders of the upper and under grinders, over the cheeks, and the membrane of the mouth, and to the angle of the mouth. It tightens the membrane of the mouth, and thus principally assists in the disposal of the food in the mouth, and also in retracting the angle of the mouth.

10. A branch of the *os hyoides.*

11. The *stylo-maxillaris*, from the styloid process of the occipital bone, to the angle of the lower jaw, to draw it backward, and to open it. There are considerable differences in the structure and connexion of this muscle in the ox and the horse, but they would be difficult to explain in a work like this.

12. That portion of the stylo-maxillaris, which is called the *digastric*, from its double belly, is seen here.

13. The little flat muscle, the *stylo-hyoideus*, is here represented, but even thinner than in the horse; extending from the styloid process of the occipital, to the angle of the corner of the hyoid bone, and its action confined to the retracting and elevating of the corner of that bone.

14. A muscle of the larynx.

15. The *parotid gland* (the gland in the neighbourhood of the ear,) the greater part of it reversed, to show the parts beneath.

16. The *parotid duct* winding within the angle of the jaw, and escaping again at a very little distance (its course within the jaw not being one-half so long as it is in the horse,) and in company with the maxillary vein and artery climbing up the cheek, and perforating the buccinator muscle, in order to discharge its contents into the mouth. The orifice is generally found about the third or fourth grinder. The situation of the duct, so much more posteriorly than in the horse, should be carefully observed, for obstruction and fistula of this duct is far more frequent in the ox than in the horse, and operations of various kinds may be necessary.

17. The *sub-maxillary gland* (the gland under the jaw,) placed more posteriorly in the ox than in the horse. Its commencement is almost as high as that of the parotid, but behind it; thence it reaches down to the angle of the jaw, and there begins to take a direction forward between the branches of the lower jaw, and terminates in a duct which opens on either side of the frænum of the tongue.

18. *Lymphatic glands* (glands containing lymph) of the neck, placed still more posteriorly.

19. *Lymphatic glands* found between the branches of the lower jaw; neither belonging to the sub-maxillary, nor sublingual glands, but often confounded with them. They become inflamed and enlarged in almost

every case of catarrh, and they are some of these glands which, by their hardness and adherence to the jaw, indicate glanders in the horse. These glands often enlarge to a very considerable degree in the ox, and suppurate, and troublesome ulcers ensue.

20. The *jugular* vein (the vein of the throat,) previous to its bifurcation, and pointing out the usual situation for bleeding. Cow-leeches, however, bleed somewhat lower, and there is no great harm in that.

21. The *sub-maxillary vein* returning the blood from the tongue, the mouth, and the face generally. It is scarcely lost at all within the angle of the lower jaw, but runs along the edge of it, and might be opened with advantage in some affections of the face. When it emerges from the jaw, and begins to climb up the face, it is found between the parotid duct and the sub-maxillary artery.

22. The larger branch of the *jugular* above the bifurcation receiving the blood from the upper part of the face and neck, and also from the brain. A bleeding from this branch is practicable in the horse, and is sometimes desirable when it is our object, as in cases of staggers, to get the blood as much as possible from the brain; but in the ox, it is so near to the parotid gland, that it would be difficult to open it there. The bifurcation is sometimes completely covered by the parotid gland. We must therefore be always content with bleeding below the division of the jugular in cattle.

23. The *temporal* vein (the vein of the temple.)

24. The trunk of the *parotidean* and *auricular* veins (the veins of the parotid gland and of the ear.)

25. The *internal jugular*, and particularly its passage below the subscapulo-hyoideus muscle. The path of the internal jugular by the side of the carotid, under that muscle, is marked by a dotted line.

26. The *carotid artery* (so called because a ligature of it was supposed to produce sleepiness or coma,) where it emerges from below the subscapulo-hyoideus muscle. Its path under that muscle, by the side of the internal jugular, is also marked by a dotted line, showing the connexion of the two vessels. The figures are placed at the spot where it would be most convenient to operate, if circumstances should require that a ligature should be passed round the carotid.

27. The *sub-maxillary artery* given off from the main trunk, and pursuing its course anteriorly, to bury itself beneath the angle of the lower jaw. It is afterwards seen emerging from under that bone in company with the sub-maxillary vein, and the parotid duct, and being the lowest of the three. It will be observed that, on account of there being no tuberosity of the lower jaw in cattle, the sub-maxillary artery escapes from under the jaw, and mounts the cheek more than two inches farther back than it does in the horse, and, therefore, the place at which the state of the pulse is ascertained in cattle is removed thus much farther back; and even at that place the artery will not always be distinctly felt, on account of the peculiar and double insertion of the sterno-maxillaris muscle in cattle (vid. fig. 6 in this cut,) and also because the artery is, in a manner, buried behind the angle of the jaw.

28. The *temporal artery* at which the pulse may often be conveniently examined.

29. One of the arteries supplying the parotid gland.

30. The *eighth pair of nerves*, or the motor organic nerves.

31. One of the *linguales*, or nerves by means of which the tongue is moved.

INFLAMMATION OF THE PAROTID GLAND.

The parotid gland, in cattle, is very subject to inflammation. Contusions, or wounds, of the part, are frequent causes of inflammation; and this gland, in the ox, sympathizes strongly with catarrhal affections of the upper air-passages. A bullock will rarely have hoose, accompanied by any degree of fever, without some enlargement and tenderness of the parotid. There is scarcely an epidemic among cattle, one of the earliest symptoms of which is not swelling of the head and neck. These swellings under the ear are guides on which we place much, and, perhaps the greatest dependence, in judging of the intensity and danger of the disease; and particularly, and most of all to be dreaded, its tendency to assume a typhoid form. These enlargements have been confounded with strangles, but this has been through want of proper examination of the parts.

Inflammation of the parotid gland is accompanied by heat and tenderness of the part, and which render the beast unwilling to eat, or to ruminate; and sometimes by so much swelling as to threaten immediate suffocation. This, therefore, is one of the varieties of swelling about the head of cattle characterized by the expressive term of *strangullion*,

The swelling of the parotid gland extends oftener and more rapidly downwards than upwards, reaching the throat, and pressing upon all the neighbouring vessels. When there is much swelling, suppuration and abscess are at hand, and should be encouraged by diligent fomentation; and as soon as any fluctuation can be detected, the tumour should be freely lanced; the fluid will then readily escape, and the abscess fill up: but if the swelling is suffered to burst, ulcers will be formed, exceedingly difficult to heal, and that will too often run on to gangrene. It is a singular thing that while the flesh of the ox is one of the supports of human life, and no food contributes more or healthier nutriment, there is no animal in which gangrenous ulcers are so frequently formed, or in which they are so corroding and malignant. From inflammation, apparently of only an inconsiderable portion of the parotid gland, we have known ulcers of the most offensive character extend from ear to ear, and expose the most important vessels of the upper part of the neck.

This inflammation is to be combated, like all others, by fomentations, cataplasms, and, occasionally, blisters, in the early stage; bleeding and physicking must be resorted to accordfng to the degree of general fever; and after the ulcer has formed, the chloride of lime must be used to arrest the progress of gangrene, and the tincture of aloes to heal the part after the bursting of the abscess. Mild purgatives will be very useful, each of them containing aromatic or tonic medicine.

Obstruction to the passage of the saliva will sometimes occur in the duct; swelling will ensue at the place of obstruction; and, at length, the fluid continuing to accumulate, will burst the vessel, and a fistulous ulcer will be the result. Personal examination alone will indicate the course to be pursued in such a case, but the care of an expert veterinarian will be required,

THE SUB-MAXILLARY GLANDS.

The second source of the saliva is from the *sub-maxillary glands.* The bulk of the maxillary gland is seen at fig. 17 (p. 332,) even posterior to the parotid gland. The direction within the branches of the jaw is also plainly traced; and there is a continuation of glandular substance, or a collection of little glands extending on either side within the branches of the jaws, the common duct from all of which pierces through the substance at the root of the tongue, and opens on either side of the frænum.

The termination of the duct is particularly evident in cattle, and is very curiously constructed; a cartilaginous plate doubles upon itself, and serves as a covering, or roof, to the little teat-like orifice of the duct.

BARBS OR PAPS.

Occasionally in catarrh, and oftener when the membrane of the mouth generally is somewhat inflamed, and the pustules of which we have spoken appear in various parts, these little projections likewise become red and enlarged, and the beast is said to have the BARBS or PAPS. The cow-leech will too often set to work to burn or cut them away, and converts temporary inflammation into serious, and even gangrenous ulcers. A dose of physic, and, if necessary, a moderate bleeding, will usually cause the barbs to disappear, or if a little disposition to ulceration should appear, an alum wash will be all that is needed. The scissors and the irons of the cow-leech should be kept as much as possible from the mouth of the cow.

In cases of deep abscess, which sometimes appear under the tongue, from inflammation, or, much oftener, from improper treatment, the chloride of lime will be the first and chief application. It must be injected to the very bottom of the sinuses, and continued to be used, several times in the day, while any unpleasant smell is perceived. To this will succeed the alum-wash, or an infusion of catechu, the manner of preparing which will be found in the list of medicines at the end of the work.

THE SUBLINGUAL GLANDS.

The third source of the saliva is from numerous glands scattered over the membrane of the mouth generally, but principally collected at its base and under the tongue, and therefore called the *sublingual* glands. They consist of small collections of glands, with minute openings into the mouth, but which also a little enlarge, when there is tendency to inflammation in the mouth. No harm can ever come of these GIGS and BLADDERS if the cow-leech does not make it. On every part of the cheeks and lips these little glands are found; and the quantity of saliva obtained from all of these, especially when they are excited to action in mastication or rumination, is very great.

THE VELUM PALATI, OR SOFT PALATE.

Advancing to the back part of the mouth, we find the same curtain as in the horse, dividing it from the pharynx, or cavity, immediately above the gullet. It is formed of a continuation of the membrane of the mouth anteriorly, and of that of the nose posteriorly, and it hangs from the crescent-formed border of the palatine bone, p. 273. It reaches from the palate almost to the entrance into the gullet and wind-pipe. In the horse it does quite so; it hangs upon the back of the tongue and epiglottis, and therefore all communication between the mouth and the windpipe is cut off, and the horse can breathe only through his nose; and as this curtain is so contrived as to yield to any pressure from before, but resist that which comes from behind, the food passes under it to arrive at the throat, but cannot return, and therefore also when vomiting is excited in a horse, the food is returned through the nose. In the ox, however, not reaching quite so low, the horse breathes through the mouth, the food is returned to the mouth in the natural process of rumination, and also in vomiting, when, and which occurs very rarely indeed, that process takes place, or, at least, regurgitation from the rumen, for we much doubt whether true vomiting, or the return of food from the fourth stomach, was ever seen in cattle.

THE PHARYNX.

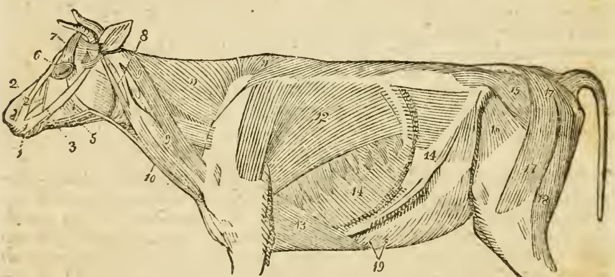
The food having passed beneath this soft palate, reaches a funnel-shaped cavity between the mouth and the gullet and windpipe. It is lined by a membrane full of little glands that pour out a viscid fluid, by which the pellet of food is covered and prepared to pass more readily down the gullet. Within this membrane are muscles that contract with considerable force; and the food, almost beyond the action of the tongue, is seized as it were, by these muscles and forced along the pharynx to the entrance into the œsophagus or gullet.

Having thus completed our survey of the head, we must entreat the patience of our readers while we take a rapid view of the anatomy and proper form of the neck and chest of the ox: and if we draw occasional comparisons between the structure of these parts in the ox and the horse, as connected with the use and destiny of the two animals, a recollection of the peculiar valuable points of each will be more deeply impressed on the mind of the reader, and we shall have interesting proof of the adaptation of each to the purposes for which it was designed.

CHAPTER XI.

THE ANATOMY AND DISEASES OF THE NECK AND CHEST.

In order to understand the proper conformation of these parts, differing so materially as they do in a kindly feeding and an unprofitable beast, and differing, too, so much in various breeds, each excellent in its way, we must have recourse to two anatomical plates, which we will contrive so as to include, as much as possible, the whole muscular system of the ox.



1. *Orbicularis oris* (the ring-shaped muscle of the mouth.) This muscle is found within the border of the lips, and constituting their principal substance and thickness, forming two semi-ovals, and united together at the angle of the lips. It is much larger in the ox than in the horse, and mixed with more tendinous fibres, because the lips are more powerfully employed in the ox than in the horse, in grasping and assisting in tearing off the food.

2. The *elevator of the upper lip, and angle of the nose.* This muscle is much smaller in the ox than in the horse, because the lips are not used to examine and to play with things as in the horse; and the ox is not a beast of speed, requiring rapid and extensive dilatation of the nostrils: to which may be added that there are no false nostrils in the ox to be dilated, and about which this muscle is principally employed in the horse.

3. The *Zygomaticus*, (arising near the yoke-formed arch under which the temporal muscle passes) lies along the middle of the side of the face; it also assists in the motion of the lips, and particularly in retracting the angle of the lips. This is particularly developed in the ox, for it has much to do in the gathering of the food.

4. The *depressor of the lower eyelid,* a sub-cutaneous muscle of considerable development.

5. The *depressor of the lower lip,* lying along the side of the lower jaw, and going to the inferior lateral part of the under lip. To separate the under lip from the upper, this is also larger than in the horse.

6. *Orbicularis palpebrarum* (the ring-shaped muscle of the lids,) employed in keeping the eyes open. When this muscle ceases to act, the eye closes, from the elasticity of the cartilage at the edge of the lid.

7. The *levator of the upper eyelids.*

8. The *depressor of the ear.* This is a singular muscle, lying immediately under the skin; running over, and attached to, the parotid gland; and reaching from the outer side of the root of the ear, down to the very larynx. The horse has very extensive action of the ear, and holds a kind of language by means of it; but the motion of the ears of the ox have a more extensive, although slower, motion, and they have an office which those of the horse rarely discharge—viz., to defend the eyes from insects.

9. The different portions of the *levator humeri,* through the whole of their course: the upper part of this muscle was described at p. 333. On this muscle the form of the lower part of the neck principally depends, and it is much more developed in some breeds than in others; but in all it is larger at its inferior insertions than it is in the horse. However thin and deer-like we may wish the neck of a favourite ox to be at the setting on of the head, we look for plenty of muscles at the bottom of it, or we shall have neither strength nor substance in any part of the animal.

10. The *sterno-maxillaris,* described at p. 333.

11. The *trapezius* (the quadrilateral muscle.) This muscle in the ox is united with the *rhomboideus longus,* and forms the exterior muscular layer immediately below the integument, and above the *splenius.* (See p. 332, and also the next Cut.) On this, and on the splenius beneath, depend the form of the upper part of the neck and withers, and, in some breeds, the cervical portion of it is particularly fine. The combined action of the whole is to raise the scapula, and draw the bone forwards.

12. The *latissimus dorsi,* so called from its extent, being the widest muscle of the back, and reaching over the whole of the upper and side part behind the scapula, of which bone it is a muscle, drawing it backward, and elevating its inferior extremity. It is thinner in the ox than in the horse, except that much adipose matter insinuates itself between the fibres, and gives it a false appearance of substance. In fact, it has much less work to do than in the horse.

13. The *pectoralis major* (the larger pectoral muscle.) It is in the ox the only pectoral muscle, properly so speaking, for the minor is not found. There are, however, the transverse pectorals, of which we shall give an account presently. From the ensiform cartilage at the termination of the true ribs, and even from the external oblique muscle of the belly, it extends forward, strongly attaching itself to the fourth, fifth, and sixth pieces of the sternum, and also the lesser tubercle of the humerus, and the inner part of the end of the scapula or shoulder-blade. It draws the scapula into an upright position. This muscle is considerably smaller than in the horse, because it has not the work to do.

14. The *external oblique* muscle of the abdomen. It extends over the whole of the inferior and lateral portions of the belly, giving support to the contents of the belly; assisting in the evacuation of the fæces and urine, and also in that of the fœtus, and being a valuable auxiliary in the process of breathing. Although it has not so much work to perform as an auxiliary muscle in respiration, or in supporting the abdomen and its

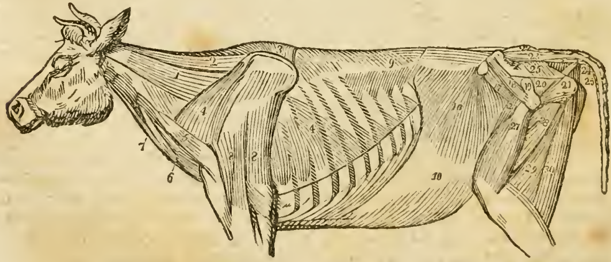
contents in the shocks to which they are occasionally exposed in rapid motion, yet this and the other oblique muscle have a great deal more constant labour than is generally supposed in supporting the immense weight of the distended paunch, and sometimes powerfully contracting upon it. These oblique muscles, which constitute the flank pieces of various kinds in the carcass, are of considerable thickness, and never overlooked by the butcher when examining a beast.

15. The *glutæus maximus*, or great muscle, belonging to the buttock, principally constitutes the anterior middle, and external parts of the haunch. Its attachments are very complicated, and its action is what its situation at once indicates, either to flex and bring forward the hind limbs upon the loins, or the pelvis and loins upon the hind limbs, accordingly as either is made a fixed point. This muscle, as we may suppose, is small in comparison with that of the horse, for although the cow can sometimes jump over a gate, almost as well as any horse, and Mr. Pekins's Nagore bull could not be restrained by any fence, no great speed is usually required from them, nor do they want the sudden and powerful flexion of the limbs which is sometimes demanded from the horse. This muscle is brought into view in cattle by raising the aponeurotic expansion of the *fascia lata*, and it is concealed superiorly and posteriorly by the prolongation of the *semitendinosus* muscle.

16. *Fascia lata.* This muscle, although we have termed it a *fascia* or envelope, is a fleshy and tendinous expansion over the whole of the anterior and external surface of the thigh, whence it spreads below the stifle. Its chief use is to strengthen the muscles beneath; but, besides this, it assists the extension of the leg on the thigh and the flexion of the thigh on the pelvis. It is a more extensive and thicker muscle in cattle than in the horse. Its fleshy portion is divided into two, and its tendinous expansion extends over all the muscles of the quarters, and unites with the principal flexor muscle of the thigh—the *adductor magnus*. This is a part of the beast where we look for plenty of muscle and fat, and the cloddy buttocks of the first Dutch cattle having passed away, we can hardly find quarters too long and too well developed.

17 and 18. The *biceps femoris*, or two-headed muscle of the thigh. In the horse, it is attached above to the spine of the sacrum, and to some of the upper bones of the tail, and below by one head to the patella or bone of the knee, and by another extending to the tibia, and the fascia covering the leg. It flexes the leg upon the thigh, and contributes to turn the leg inwards. In cattle, it has no spinal prolongation, and it does not ascend beyond the ischial tuberosity.

19. The foramina belonging to the sub-cutaneous abdominal vein.



1. The *splenius* lying under the trapezius, and which has been already described in p. 332.

2. The anterior portion of the *trapezius*, extending along the edge of the cervical ligament, from the back of the head to within the superior part of the scapula, and raising the scapula and carrying it forward. We have already alluded to it, p. 339.

3. The *rhomboideus longus* (the long diamond-shaped muscle.) It has already been stated that this muscle in the ox is united with the *trapezius*, and forms the superior and lateral part of the neck, extending from the head to the withers. It varies materially in different breeds. Nothing can be so unlike as the ridge, or crest of the neck in the Devon and the Galloway, or even the Devon and the Hereford. In all cattle it is proportionally larger than in the horse, because the neck generally was designed to be more fleshy; a fine crest, however, the neck gradually thickening below, may be considered as a point of beauty in cattle.

4. The *serratus anticus major* (the anterior part of the great saw-shaped muscles, or those by which the shoulder of the animal is attached to the trunk, and the weight of the trunk supported.) These muscles of the shoulder are more numerous in the ox than in the horse, and are more decidedly separated from each other by cellular and adipose matter. The strength of attachment which the rapid motion of the horse sometimes renders necessary, is not wanted, but the accumulation of the flesh and fat goes on wherever it can. The serrated muscles are seen prolonged upon the side behind the shoulder.

5. One of the insertions of the *levator humeri.*

6. A portion of the *serratus* muscle, occupying the posterior and inferior portion of the neck, where the neck emerges from, or enters into the chest. This, in every breed of cattle, is much larger than it is found in the horse; indeed, it is altogether a different muscle, or it consists of the union of two or three muscles, particularly one lying across upon the first ribs. It is composed of a long band, larger posteriorly, which takes its origin about the middle of the fourth rib, and spreads forwards over the three anterior ribs, and even to the vertebræ of the withers.

7. Another head of the *levator humeri.*

8. The *triceps extensor brachii*, or three-headed extensor of the arm. Two of the portions are here seen, the one from the external part of the shoulder to the outer tubercle on the bone of the arm, and also to the outer parts of the elbow; and the other occupying the angular space between the shoulder-blade and the bone of the arm; the muscle has its principal lower insertion in the posterior and superior part of the elbow. There is a third portion on the interior of the scapula and the bone of the arm. The action of the compound muscle is evidently to bind the humerus, or bone of the arm, on the shoulder-blade, and thus to extend and throw forward the lower part of the limb. These muscles are, in a very marked degree, smaller in cattle than they are in the horse, and for these evident reasons, that the same strength is not required in the ox, rarely a beast of burden, and much seldomer his speed being taxed to any extent; and because needless accumulation of flesh here would be precisely in the part where it is coarsest and least valuable. The diminution of muscle on the external part of the shoulder, and the accumulation of cellular and adipose matter between it and the trunk being the reverse of what we find in the horse, are apt illustrations of the skill with which every animal is adapted to his destiny.

9. Another portion of the *serrated* muscles, belonging to the back and ribs. These are principally muscles of respiration; they elevate the ribs,

and bring them forward, and thus expand the chest, and assist in the process of inspiration. This is a small muscle compared with that of the same name in the horse, because from the idle life of the ox, his breathing is seldom hurried.

10. The *internal oblique* muscle, or inner layer of muscles constituting the walls of the belly. These muscles assist the external ones in supporting the weight of the belly, and compressing its contents. Being placed somewhat farther back than the external oblique, they will offer less assistance in respiration, but contribute more to the expulsion of the urine and fæces.

17. The *iliacus internus*, or inner and larger muscle belonging to the flanks, occupies the upper and inner space between the spine and the thigh. Its use is to bring the thigh under the haunch, which, in the slow-motioned ox, is rarely performed with much rapidity or force, therefore they are not so developed as in the horse. It enters into the composition of the *aitch* bone and the upper part of the round.

18, 19, 20. The *glutæi muscles* lie on the upper and outer parts of the haunch, and the good or deficient form of the quarters depend upon them. They are important in the horse, as indicating the strength of the quarters. They are valuable in the ox, as indicating the general muscularity of the system. This may, however, be carried too far, and it used to be in the old Holderness cattle. In the horse, in whom they have so much to do, these muscles are coarse and fibrous; but, contributing to the formation of the rump, and, in a certain degree, of the round, they constitute some of the tenderest and most valuable parts of the ox.

21. The *pyriform* (pear-shaped) muscle, found within the cavity of the pelvis, and on the inside of the aitch-bone and the rump. Small and tendinous in the horse; much larger, and composed of softer fibres, in the ox. Its office is to assist in the extension of the haunch.

22. *Levator caudæ brevis* (the shorter elevator of the tail,) of which the horse makes beautiful use, when, in the moment of excitement, he gallops along with his tail arched: it is used in common with other muscles to drive away the insects which annoy the animal.

23. *Levator caudæ longus* (the long elevator of the tail.)

24. *Depressor caudæ*, by which the tail is pressed upon the haunch, and that sometimes with a force that would scarcely be thought possible.

25. The *intertransversal muscles*, whose oblique fibres run from the base to the edge of the bones of the tail, through its whole extent, and by which the lateral motions are affected. By the union of all of these muscles the tail is made a most effective instrument in driving away or destroying thousands of winged blood-suckers, by which the animal would otherwise be tormented.

These muscles are not so large or so strong in the ox as in the horse.

26. The *rectus femoris*, or strait muscle of the thigh, runs along the whole of the anterior portion of the thigh, from the ilium, to the patella, or knee-cap. It is a very conspicuous muscle in the round, and helps to extend the thigh and advance the haunch. This muscle, however, is not so large in the ox as in the horse.

27. The *vasti muscles*, so called from their occupying the greater part of the thigh. The three branches are much more distinct than in the horse, but they are not so much developed, for they have not the work to do. The butcher thinks, and very truly, that there is a great difference between the round of the beast that has worked, and of another that has done no work at all; and he is very right, for nothing tends so much to the development of the muscular system as regular exercise.

28. The *great adductor*, or bringer forward of the thigh. This muscle occupies the external face of the posterior part of the thigh. It rises as high as the spine of the sacrum, and reaches the anterior portion of the leg by three different branches or heads, and thence called the *triceps adductor femoris.* It flexes the leg upon the thigh; it carries the whole limb backward in the act of kicking, and also assists in elevating the fore-part of the body in preparing for a leap. It is larger than in the horse, reaching along the spine, to the very angle of the croup.

29. The *semitendinosus*, so called from its half-tendinous construction, constitutes, with the next muscle, the posterior and internal face of the haunch and thigh. It is a flexor of the leg.

30. *Adductor tibiæ longus* (the long adductor, or bringer forward of the thigh;) sometimes called, from its construction, the *semi-tendinosus* muscle. It is not so closely connected with the former in the ox as it is in the horse, but it is, like it, a flexor of the leg.

The reader is now, perhaps, prepared to enter with us, so far as we can do it without being too drily anatomical, into the consideration of the form and structure of the neck and trunk of cattle; and particularly as connected with the two grand purposes for which they are bred—the production of milk while living, and animal food when dead.

DESCRIPTION OF THE NECK.

The neck of the ox (see cut of skeleton, p. 272) is composed of seven bones, possessing the same relative situation, and distinguished by the same names, as in the horse. (See p. 63, 'Horse.') Let us first take a rapid glance at the neck of the horse. Observe the long chain of bones—each small, compared with the length of the chain—smooth—so connected as to assume an arched form—and the head so set on, that pressure or power bearing upon the lower part of it, the mouth, and in the direction of the body, is modified and assisted by every varying bend of the arch of the neck. We cannot look at it for a moment without being convinced that the purposes, in view, and which are beautifully accomplished, were gracefulness, lightness, facility of motion, and the perfect play of elasticity. If the hand of the rider or driver must, after all, bear a portion of the weight, and have the guidance and management of the whole machine, everything is so contrived, that that weight shall be scarcely felt, and that the immense strength of the horse may often be safely managed by the energies of a child.

Now, let us observe the neck of the animal that is the subject of the present Treatise—an animal valuable, but for other purposes. Observe the shortness of the neck generally—the shortness, and yet the magnitude of every bone—the avoidance of the comparatively smooth surface which we have observed in the horse, and the springing out, above and below, and on one side and the other, of processes which, although found in the horse, are neither so long nor so broad, nor so roughened. Then that proudly-arched crest which we admired so much in the horse—it has vanished; or rather, if it exists at all it is reversed: while the head is set on in a ten-times more awkward manner than we find it in the most determined star-gazer. Pleasure of riding or driving cannot, for a moment, be associated with such an animal; and there is not an elastic movement about the whole of this part of the machine. True, oxen are ridden in the interior of India. It is because they are the cattle of the country, and few horses are there; and, after all, they are used for little else than the conveyance of despatches, in which the superior officer rarely consults the ease or comfort of the messenger; or for the drawing of carriages, where pleasantness of action is a matter of no consequence. They are used, also, by the inhabitants of the vales of Mandara; but horses are there unknown.

The intention of nature is plain enough in the construction of the neck of the ox. All these widened, roughened, tuberous bones are for the attachment of muscles—the accumulation of flesh. More can be got on the neck of one ox than of two horses. True, these are not the prime parts of the animal, but we see the commencement of the principle. The one animal was destined to carry us for our pleasure, and the other to produce flesh and fat for our nourishment. Let the reader compare two almost perfect examples—the neck of the horse (in p. 154 of that Treatise) and the neck of Mr. Mure's Queen of the Scots, and deservedly was she called so, in p. 166 of this work. In both of these, Nature is working wisely and well, and in both she is fitting the animal for the situation it occupies in the creation.

A little of the arched form of the neck may be traced in the Devon ox, and is no detriment either to his appearance or his actual value; although common consent seems to have determined that the line from the horns to the withers should scarcely deviate from that of the back. Is this trait of the thorough bred horse, here appearing in cattle, connected with that activity in work for which this breed has ever been unrivalled? This form of the neck is seen to advantage in the cut of Lord Western's working Devon ox, just beginning to fatten. The Sussex, and Hereford, and Pembroke, and Welsh, generally, and all the Scots, horned, or humbled, have, occasionally at least, this rising of the forehand; and we must be permitted still to retain this form of the neck, as one of the characteristics, and no defect, of the middle-horns, who, in particular districts, and for particular purposes, will still remain and be duly valued, when the triumph of the short horns is complete.

We must go even a little further than this, and claim the rising crest as an essential point in every good bull of every breed. It shall be, what, in the majority of cases, it perhaps is, nothing more than an accumulation of fat about the ligament of the neck, and the *splenius* and *complexus* muscles; but it indicates that broad base of muscle beneath—that bulk and strength of neck, so indicative of the true masculine character. We refer to the Devon bull (p. 13,) to whom, indeed, it belongs, in virtue of his breed—and we refer, slso, to the West Highland bull (p. 65,) who has the same claim to it, and also, to the Old Craven bull (p. 189;) to the new Leicester bull (p. 196,) and even to the short-horned bull (p. 242;) nay, we must not forget the Nagore bull (p. 268,) who to the arched form of his neck owes much of the beauty which he actually possesses, notwithstanding the unsightly hump upon his shoulders.

The actual bulk of muscle, however, in any part of the ox is not so much greater as the extended and roughened surfaces would lead us to imagine. The head, or the insertion of the muscle, may be spread over the whole surface of the bone; but we have not proceeded far in our examination of that muscle, before we find that its structure, at least in the unworked ox, is not so compact as that of the horse. A great deal more cellular and adipose substance is inserted, not only between the different muscles, but between the little divisions or bundles of which each muscle is composed; and, in fact, between the very fibres of the muscle itself; and that to so great an extent, that in a well-fatted beast it is almost impossible to meet with any simple muscle. The whole is *marled*—streaks of fat enclosed in cellular substance, run parallel with almost every fibre. This, at least, is the case with many breeds of cattle; and it was one of the greatest triumphs achieved by the early advocates of the short-horns, when they were enabled to get rid of the dark *liery* flesh of the old Holderness, and substitute the far superior, yet not even now, to its full extent, the fine-grained marled beef of other breeds. Some improvement might be effected here, and it is well worth the trial.

THE PROPER FORM AND SIZE OF THE NECK.

Some breeds of cattle used to be remarkable for the fineness of the neck at the setting on of the head, and this was considered to be one of their greatest beauties, as well as the surest proof of the purity of their breed: this was long the case with the North Devon ox, and when, by chance, this fineness extended to the withers, and was accompanied by a shoulder almost as oblique as that of a thorough-bred horse, the animal was imagined to be perfect. He was a beautiful and a valuable animal and particularly as this fineness of the neck and withers was usually contrasted in him by a deep breast and an open and wide bosom. That man, nevertheless, deserved the thanks of the Devonshire breeders, who first stealthily introduced one cross with the Hereford; he a little diminished this fineness of the neck, but he did not impair the general beauty of the animal: he did not lessen his activity in the slightest degree; but he increased his size, and his aptitude to fatten too.

In the Ayrshire cow of twenty years ago we had a specimen of the extent to which a clean neck and throat might be carried, without perhaps, diminishing at all the milking properties; but, we apprehend, materially to the disadvantage of the farmer when her milking days were past. This prejudice in favour of the small neck led the farmer even to 'prefer their dairy-bulls according to the feminine aspect of their heads and necks.' Perhaps the disparity of size which then existed between the northern and southern cattle might somewhat justify them in choosing the smallest variety of the new breed. This, however, having passed over, the Ayrshire breeder, still fond of a neck finely shaped towards the head, has produced one a great deal thicker towards the shoulder and breast; and this not interfering as experience has now taught him, with the milking qualities of the animal, while it gave an earnest of aptitude to fatten afterwards.

Mr. Marshall, when describing the new Leicester breed, speaks of 'the *forend* being long, but light to a degree of elegance; the neck thin, the chap clean and the head fine; the shoulders remarkably fine and thin, as to bone, *but thickly covered with flesh, and not the smallest protuberance of bone discernible*.' He also thus speaks of Mr. Fowler's celebrated bull Shakspeare:—'His head, chap, and neck were remarkably fine and clean; but his chest was extraordinarily deep, and his brisket down to his knees.'

The present improved short-horn, in his state of greatest and most unnatural fatness, has, or ought to have, a tendency to fineness of the neck, at the setting on of the head, however that neck may rapidly increase in bulk, and in the opinion of some, give too great a weight to the fore-quarters.

The *splenius*, *trapezius* and *complexus* muscles are those which have most to do with the usual bulk of the superior part of the neck, and with that which it may attain under the process of fattening. The *splenius* may be seen at fig 1, p. 332; the *trapezius* is depicted at fig. 11, p. 339; and the *rhomboideus longus*, with which the trapezius is united in the ox, is brought into view at fig. 3, p. 341. The *complexus major* is situated under them. Some of it rises as low as the transverse processes of the four or five first bones of the back, and from all, except the two higher of the bones of the neck. It therefore has its greatest bulk about the lower part of the neck; and on it, and the fatty matter connected with it, the form and bulk of that portion of the neck depend. Its office is to raise the neck; and elevate and protrude the head. It is, however, generally speaking, a much smaller muscle than in the horse. It has not so much to do: there is not so extensive and rapid motion of the head required from the ox. The form of the under part of the neck is much influenced by the *levator humeri*, which is seen at fig. 4, p. 332; fig. 9, p. 338; and, still lower down, by the *pectoral* muscle; for there is but one in the ox, seen at fig. 13, p. 339. Considering, however, the laxity of the muscular fibre in the ox, and the interposition of fatty matter in every part of the muscular system, this muscle can acquire considerable bulk, and is, as we have said, that on which the form and bulk of the neck, at its lower and more important part, principally depend. Whatever may have been said of fine and small necks, the neck must rapidly thicken as it descends, or we shall have a general lightness of carcass, which will render the animal comparatively worthless as a grazing beast.

There are other muscles, however, placed under the *complexus*—viz., the *complexus minor*, and the large and small *recti*, and *oblique* muscles, concerned in the lateral motion of the head, which have comparatively greater bulk in the ox than in the horse and contribute materially to the bulk of the neck.

THE ARTERIES OF THE NECK.

Before we leave the neck we should describe the principal blood-vessels which are brought into view in the cut at p. 332. The *carotid artery* (fig. 26, pp. 332 and 335,) and some of its ramifications, are the only arteries that we could bring into view. The carotid artery on either side, as in the horse, proceeds from the heart—escapes from the chest with the windpipe and the gullet; and approaching the windpipe, and clinging to its posterior surface, climbs the neck, supplying the different parts with blood, until it arrives at the larynx, where it divides into two branches—the external and internal. The external ramifies over the face and external part of the head—the internal enters the skull and is the main source whence the brain derives its arterial blood. Smaller streams are sent to the brain from the vertebral arteries, which, defended and partly concealed in canals formed for them in the bones of the neck, after having fed the neighbouring parts, likewise expend the remainder on the brain, entering by the great foramen, through which the spinal chord escapes. A third and smaller branch, leaving the main trunk high up in the neck, sends a small vessel to the brain, under the title of the occipital artery.

We can conceive of very few, if any, cases in which it would be either necessary or advisable to bleed from an artery in the ox. The temporal, which we sometimes, but not quite justifiably, open in the horse, is, in a manner, out of our reach in the ox ; and the artery of the forehead, although larger than in the horse, is so defended by its bony canal, as not to be easily got at; besides which, in bleeding from an artery, there will always be extreme difficulty either in getting the quantity of blood which we want, on account of the contraction of the vessel, or of stopping the hæmorrhage, if the blood flowed freely. We will, therefore, only speak of a few anatomical points of difference, of which it is possible that advantage may, yet very rarely, be taken in a practical point of view.

There is one circumstance which will strike every one who compares the vascular system of the horse and the ox, and that is—with the exception of the larger vessels immediately from the heart—the smallness of the arteries, and the largeness of the veins. What enormous vessels, compared with the corresponding ones in the horse, are the jugulars and milk veins! and what a torrent of blood will pour from them if a large incision is made! Is it that there are fewer large venous trunks in the ox than the horse, and that, therefore, these few must be large? Anatomical research does not sanction this;—or has it reference to the functions which the two animals are generally called on to discharge, or does it give us a practical lesson, as to the nature and proper treatment of these two classes of the veterinary surgeon's patients? We do not feel ourselves yet qualified to enter into the consideration of these questions, although they are most important ones. We shall bear them in mind as we pass on.

Most of the arterial vessels of the head and face are smaller than in the horse.

The *sub-maxillary artery* has been already described (fig. 27, pp. 332 and 335,) pursuing its course anteriorily, to bury itself beneath the angle of the lower jaw, whence it speedily emerges again, and much closer to the angle of the jaw than in the horse. This should be remembered when we are feeling for the pulse; for many a beginner has felt himself a little mortified, because he could not find the vessel in what he supposed was its proper place, and sometimes could not find it at all. It occurs under some circumstances of disease, that even in the horse it is difficult, or impossible, to ascertain the pulse at the jaw. This is oftener the case in the ox, from circumstances that have already been explained, and should, therefore, teach us to go at once to the side when there is any difficulty about the jaw.

The *temporal artery* is much larger in the ox than in the horse, because it has a greater surface to ramify upon and to feed: the figure will point out the spot at which the pulse will usually be most conveniently felt.

The *anterior auricular artery* is also large in the ox. It supplies not only the anterior muscles of the ear, but also the temporal muscle; not, indeed, so developed as that of the horse, but deeply lodged in the temporal fossa. The pulse may be very readily felt by means of it, and perhaps more readily than from the temporal.

The *superciliary artery*, escaping from the foramen above the orbit of the eye, is a considerable one. It forms two branches, of which one goes to the root of the horn, and contributes to the vascularity and nutriment of that part. The other descends downward, on the side of the face.

The *occipital artery* is smaller than in the horse: the brain of the ox, which a branch of this artery supplies, is but one half as large as the brain of the horse.

THE VEINS OF THE NECK.

We here recognize the two jugulars which are found in most animals, but not in the horse. The smaller, or *internal jugular* (fig. 25, p. 332,) is deeply seated, and no practical advantage can be taken of it, save the knowledge, that in inflammation and loss of the external vein from bleeding, the return of the blood from that side of the face and head would be facilitated by the internal one: but even in the horse little injury is sustained by the loss of the external jugular, for nature is wonderfully ingenious in making provision for carrying on the circulation.

BLEEDING.

The jugular is, by common consent, adopted as the usual place for bleeding cattle. The vessel is easily got at; it is large, and can scarcely be missed by the clumsiest operator. The strap round the neck, in order to raise the vein, should be dispensed with, at least among practitioners. It presses equally on both sides of the neck; and we have, more than once seen consequences that, for a little while, bore an alarming appearance, produced by this sudden stoppage of the return of so much of the blood from the vein. If the vein is pressed upon by the finger, a little below the intended bleeding place, it will, as in the horse, become sufficiently prominent to guide any one who should be entrusted with the bleeding of a beast.

The instrument of the veterinary surgeon should be the lancet, but one considerably broader-shouldered than he uses for the horse. A larger vessel will bear a proportionably larger orifice; and the good effect of bleeding depends more on the rapidity with which the blood is abstracted, than on the quantity drawn. The cowherd, or the owner of cattle, would do better to confine himself to the old blood-stick and fleam, for the hide of the ox is so much thicker than that of the horse, and the edge of the lancet is so apt to turn, that it requires a little experience and tact to bleed with certainty and safety.

In the abstraction of blood from the ox, and especially at the commencement of a disease, or while inflammation runs high, the rule is the same as in the horse—viz., to let the blood flow until the pulse plainly indicates that the circulation is affected. All other bleeding is worse than useless—it is sapping the strength of the constitution, and leaving the power of the enemy unimpaired.

We have seen as bad necks in cattle after bleeding, as in the horse, but they are not so common. They must be treated in the same way, by fomentations and emollient lotions at first, and when these fail, the application of the heated iron to the lips of the wound; or, in very bad cases, the introduction of setons, or the injection of the zinc-wash into the sinus.

BLEEDING PLACES.

If any affection of the mouth, or the nasal passages, should demand local evacuation, cattle may be bled from the *palatine vessels*. If the operator cuts but deep enough, plenty of blood will be obtained. The *cephalics* before, and the *saphena* veins behind, are proper places for bleeding—and some say the *milk*, or *sub-cutaneous abdominal* veins. This last vein is large enough for the speedy abstraction of any quantity of blood in the shortest period; and if it were not a little awkward to get at, might be occasionally used, but the jugular is the most convenient bleeding-place in particular cases; and the only question is, whether any local advantage can be obtained by opening the sub-cutaneous abdominal.

THE MILK, OR SUB-CUTANEOUS ABDOMINAL VEIN.

We will very briefly inquire into this. Professor Girard, in his excellent 'Anatomy of Domesticated Quadrupeds, thus describes the milk vein, or, as he more properly terms it, the *sub-cutaneous abdominal*, lying immediately under the skin, and passing over the belly. 'This vein, the subcutaneous abdominal, first comes into view under the abdomen, at the commencement of the cartilaginous circle of the false ribs. It emerges from two foramina, or openings, (the situation of which is pointed out by fig. 18, p. 338.) It approaches, on either side, the mesian line of the abdomen, and burying itself between the thighs, it pursues its course towards the inguinal vein. Sometimes it unites with the superpubian vein, and occasionally gives a branch to the sub-pelvian. In the neighbourhood of the cartilaginous circle, it presents two branches, the one external and superior, the other internal and inferior. The first springs from various cutaneous ramifications, reaching even to the thorax, and anastomosing with some of the sub-cutaneous veins of the thorax. The other branch penetrates within the cartilaginous circle, and goes to unite with a principal division of the veins of the sternum.'

It appears, then, that this milk vein is derived from numerous ramifications from the walls of the chest as far anteriorly as the sternum, and taking in some of the external intercostals. It belongs to the respiratory system more than to any other. As it advances posteriorly along the abdomen, it creeps by the side of the udder, or of the scrotum, and disgorges itself partly into the inguinal, and partly into the subpelvian vein. As it travels along the abdomen and the groin, it receives some muscular and cutaneous fibres, but nothing more. Its use is to assist in returning the blood from these parts, and also by this roundabout journey, and these curious anastomoses, to establish a free communication between the *anterior and posterior cavæ*, or the blood which is returned from the anterior and posterior portions of the body. This may be a matter of considerable consequence in certain states of the constitution.

Then the question, Whether we should have recourse to the milk vein in order to obtain the benefit of local bleeding?, is answered. We should be justified in so doing, in cases of abdominal inflammation, for we should unload the vessels of the walls of the abdomen, and probably assist in unloading some of the internal vessels too, and we should abate the danger of peritoneal inflammation. For yet stronger reasons, we should have recourse to it in thoracic affection, for most of the smaller ramifications which compose this vein come from the thorax, and there is greater sympathy, and there are more numerous anastomoses between the outer and inner portion of the wall of the chest than of the abdomen. But if we were to have recourse to bleeding from this vein, in garget, or any inflammatory affection of the udder, we should betray our ignorance of anatomy; and still more so should we do it if we regarded this milk vein as having any further connexion with the secretion of milk, than as being a kind of measure or standard of the power and development of the vascular system, with the existence of which the secretion of milk, as well as the secretions generally, is essentially connected.

THE HEART.

We return to the neck, and we can trace the veins in their course down it to the heart, and the arteries working their way upward from the heart. We therefore naturally enter into the consideration of this viscus—this great source of the circulation of the blood. We shall find, by-and-by, that the lungs, on either side, are inclosed in a separate and perfect bag; each lung has its distinct pleura. The heart lies between these two membranes; and, more perfectly to cut off all injurious connexion between the lungs and the heart—all communication of disease—the heart is inclosed in a pleura, or bag, of its own, termed the pericardium. This membrane closely invests the heart; it supports it in its situation, prevents too great dilatation when it is gorged with blood, and too violent action when it is sometimes unduly stimulated. Notwithstanding the confinement of the pericardium, the heart beats violently enough against the ribs under circumstances of unusual excitation; and were it not thus tied down, it would often bruise and injure itself, and cause inflammation in the neighbouring parts.

INFLAMMATION OF THE PERICARDIUM.

We shall speak of this membrane somewhat at length, because it is occasionally the seat of obscure, unsuspected, and fatal disease. The cow is a greedy animal; she will swallow almost every thing that comes in her way, as we shall have occasion to show when we treat of the rumen or paunch. The wire-riddles, or sieves, which are used in the winnowing of corn, have sometimes been demolished by her out of mere idleness. She will pick up large pins and needles, and especially if the latter should have any thread attached to them. A friend of ours lost a cow from some disease which neither he nor the medical attendant understood. On opening her, a piece of wire, two inches in length, was found sticking in the pericardium, and which had produced extensive ulceration and gangrene there.

Another cow was attended by Mr. Cartwright of Whitchurch. She was near the time of calving, when she became seriously ill, but the symptoms did not indicate any connexion with parturition; indeed they were of that obscure nature that it was impossible to say what was the malady. They were dulness, unwillingness to move, constipation, and œdematous swellings about her. She died on the sixth day. On opening her, it appeared that the heart, and its investing membrane, or bag, occupied nearly three times their natural space. The delicate and transparent membrane was thickened until it bore no slight resemblance to a portion of the paunch; and the bag contained a gallon of discoloured fluid. A piece of a darning needle, two inches and a half in length, with the eye broken off, was found in the pericardium, and a small ulcer, three-quarters of an inch deep, appeared near the apex, or point, of the heart. Two sixpenny nails were found in her paunch.

Mr. Horsefield, of Wentworth, gives a similar account. He was desired to see a large fat heifer. She was dull; the breathing quickened; the pulse, also, quick, but intermitting; the extremities cold; she refused to eat, and there was no rumination. It was impossible for the most skilful practitioner to determine what was the nature of the disease; there was fever, general derangement, but nothing more could be affirmed. Mr. H. did all that he could do; he bled her, and the bowels being already open, he administered fever medicine. The next day she was no better; he bled her again; and physicked her. On the following day, some slight symptoms of dropsy in the chest appeared; he watched them, he made use of that invaluable, but too much neglected method of detecting disease—the application of the ear to the side and belly of the patient—and he assured himself that there was effusion in the chest. He then knew well that no good could be done, and he ordered her to be destroyed. Not only the pericardic bag, but the whole of the chest was filled with serum: the inflammation had spread over all the membranes; but the focus of the evil was a large pin, two inches long, which had pierced through the pericardium, and wounded the heart. The pericardium was thickened, and the apex of the heart enlarged. These cases are extracted from 'The Veterinarian,' a valuable monthly periodical, devoted to the diseases and general management of domesticated animals, and from which we shall derive much assistance in the progress of this work.

We are strongly inclined to believe that these diseases occur oftener than has been suspected; and it is an unfortunate circumstance that these pointed substances, which in other animals take very strange paths, but generally comparatively harmless ones, in order to work their way out of the body, should here select this dangerous and fatal course. The proprietors of cattle, and of cows particularly—for the cow chiefly, or almost alone, has this strange propensity—will be a little more careful as to the manner of feeding them.

THE HEART.

In all animals the existence of life is connected with, or we may rather say, dependent upon, the constant supply of fresh arterial blood. There is not a secretion that can be performed, or a function discharged, or a single motion accomplished, without the presence of this vital fluid. The heart is the grand engine by which it is circulated through the frame. It is a large muscle, or combination of muscles, totally independent of the will, as those essentially connected with life should be, and working without cessation and without fatigue, from the first day of existence, until its close. It is the forcing pump by which the vital current, having completed its course, is made to flow again and again to every part of the system. It consists of four cavities surrounded by muscular walls, which, stimulated by the organic nerves, can contract upon, and drive out, and propel forward, the fluid which they contain, and then, left to themselves, can instantly re-assume their open dilated state by their inherent power of elasticity.

A portion of the blood has completed the circulation, and enters the upper cavity of the heart—the right auricle—where it accumulates as in a reservoir, until there is enough to fill the second and lower cavity on the same side—the right ventricle—when the auricle suddenly contracts and drives the blood forward into the ventricle. But this blood is in a venous state, and will not support life; then we must change its character before we throw it back again into the circulation. We must convey it into the lungs, there to be exposed to the influence of the atmospheric air, and purified, and arterialized. For this purpose the ventricle, stimulated by nervous energy, contracts, and as it contracts, it drives a little of the blood back, but it forces more under a dense fringed membrane which hangs around the opening between the auricle and the ventricle, and this membrane thus raised up all round, closes the opening, and prevents the return of the principal part of the blood that way, and it is urged through another aperture into the lungs.

We enter into these particulars that we may have opportunity to describe two or three points of difference in the mechanism of the heart of the horse and the ox. These fringes, which, in the dilated state of the ventricle, hang loose, but which are forced up as the blood insinuates itself behind them when the ventricle contracts, discharge the function of a perfect valve: but they are, as we may suppose, tied down to a certain extent by cords attached to their edges, and which spring from certain fleshy or muscular columns that arise within the ventricle. The edges, therefore, are permitted to be elevated, until they have attained an horizontal direction, and meet each other, and perfectly close the opening, and then are stopped by these tendinous cords, which oppose their strength to the further elevation of the fringes, and that regulated or increased by the muscular power of the columns beneath.

DIFFERENCES OF CONSTRUCTION.

We have said that, in the ox, the venous system is more developed than in the horse. The vessels are more numerous and larger, and more blood is pouring on towards the right auricle and ventricle of the heart. These tendinous cords, and the muscular columns beneath, are very considerably larger and stronger in the ox than in the horse, in order to afford adequate resistance to the greater pressure of the blood. In this ventricle of the heart of the ox, there is also a band, or fleshy muscle, running across from one side to the other, the double effect of which is beautifully evident, viz., to prevent this cavity from being too much dilated, or possibly ruptured, when the blood flows rapidly into the heart; and to assist the ventricle in contracting on the blood. A smaller and more tendinous band runs across the same ventricle lower down, and for the same purpose. There is no contrivance of the kind in the horse. The heart of that animal has enough to do, and especially under circumstances of excitation or disease, to circulate the blood in sufficient quantity and with sufficient force; but the walls are thick and strong, the pump has great power, and there are only occasional demands on all its energies. In the ox, however, from the peculiar arrangement of the circulatory system, there is always this pouring on of blood to be arterialized; for the secretion of milk, or the deposition of fat, constitute the daily, unremitting duties of the animal. There is not only to provide against accident, but, to fit the heart for this incessant hard work; and this supplemental muscle in the form of a fleshy band stretching across from one side to the other is given, preventing dilatation, and assisting in contraction. The right ventricle of the heart of the ox is worth inspecting for the purpose of examining this contrivance.

The blood is driven out of the right ventricle into the lungs, and is there exposed to the action of the atmospheric air, and purified; thence it is returned to the left auricle, passes into the left ventricle, and, by the contraction of that cavity, is propelled through the arteries. The left ventricle is composed like that of the horse, except that these vessels, being large enough doubtless for the distribution of sufficient blood for the general purposes of nutrition, yet are not large enough for the occasional enormous demands on the heart of the horse; in fact, being smaller than they are in the horse, more power is required to force a fluid through a narrow than a capacious canal, and the walls of the ventricle are thicker in the ox. The diminished calibre of the arteries is no where more apparent than in the neck; the carotids of the horse are nearly double the size of those of the ox; the jugulars are scarcely half as large.

We begin, perhaps, to have a glimpse of the cause of the evident difference in the size of these different classes of blood-vessels in the horse and the ox. The work of the one, although hard, is equable. There is little in the habits or the services of the one to cause much variation in the demand for blood. The labour of the other is irregular, often to the greatest degree, and the vessels must be enabled to accommodate themselves to this irregularity. The artery is a highly elastic tube, and will accommodate itself to the smaller quantity of blood usually circulating in the horse, but it is actually of greater size, to give free passage to those sudden rushes of blood from which the ox is, in a state of health, comparatively exempt.

In the posterior aorta, however, or the large vessel which first receives the blood from the heart in order to carry it to the viscera and the hinder extremities, this is, in some measure, reversed, or at least some of the arteries attain a magnitude not known in the horse. This is particularly the case with the cœliac artery, which supplies the liver, the spleen, and the stomachs. The branch going to the liver is not much enlarged, but the splenic one is, because many ramifications from it go to the rumen; and the gastric artery, or the artery of the stomach, is considerably larger than the whole of the cœliac in the horse. We need not, however, wonder at this when we consider the immense size of the rumen, or paunch, and the important offices discharged by the other stomachs.

The vessels from the left ventricle, which carry the arterial blood through the frame, and those from the right ventricle that convey the venous blood to the lungs, alike spring from the muscular and fleshy septum, or wall, that separates the cavities of the heart, and divides that organ into two distinct parts. These openings are so strengthened by the manner in which they are connected with the septum, that their rupture or dilatation in the horse is scarcely possible, however powerful may be the action of the heart. But the ventricles of the heart of the ox have more constant and hard work to do, and additional strength is given by the insertion of a bone into the septum at the base of these arteries, more belonging to the aorta than to the pulmonary artery, but meant as a support to both. This *os cordis*, or bone of the heart, is found in most ruminants, except the roe and fallow deer; and they appear to be formed about the expiration of the third year of the animal's life. These ossifications have been occasionally found in the heart of the human being, and considered to be the effect of disease. They are rather an effort of nature to give strength where it was wanted; and either to relieve or avert disease, although too often a contrary effect is produced.

The heart is subject to inflammation, but not so often as in the horse. It would be principally recognized by the strength of the pulse, and by the bounding action of the heart, evident enough when the hand is placed on the side of the chest, and which may be seen and heard even at a distance.

THE ARTERIAL SYSTEM.

The blood is carried on through the arteries by the force of the heart. These are composed of three coats; the outer, or elastic, by which they yield to the gush of blood; the muscular coat by which the artery contracts again when the gush of blood has passed; and the inner, or smooth, glistening coat, which lessens the friction of the blood against the side of the vessel, and its consequent gradual retardation in its course.

THE PULSE.

The muscular coat of the artery can be felt giving way to the gush of blood: and the expansion of the artery, as the blood passes, is called *the pulse*. Every one who knows the least about cattle is sensible of the importance of the indications to be obtained by the pulse. The heat of blood may be felt at the root of the horn; and the rallying of the blood round some important, but inflamed part, may be guessed at by means of the coldness of the ear, or the extremities: but here we ascertain the state of the general system, and the increased force or debility of that central machine on which every secretion and every function depends. It has been stated that the pulse is not so easily felt at the jaw in the ox. The temporal artery will generally be sufficiently distinct; but, on the whole, it will be most convenient to ascertain the beating of the heart itself, by placing the hand on the left side, a little within and behind the elbow. The average pulse of a full-grown healthy ox is about forty. The reader is here referred to what has been said of *the pulse* in the Treatise on "the Horse."

THE CAPILLARIES.

The blood continues to circulate along the arteries, until they and their ramifications have diminished so much in size, as to be termed *capillaries*, or *hair-like tubes*, although many of them are not one-hundredth part so large as a hair. The heart ceases to have influence here. No force from behind could drive the blood through vessels so minute. Another power is called into exercise, namely, the influence of the organic motor nerves on the muscular sides of these little tubes.

This is by far the most important part of the circulation. The blood is carried through the arteries mechanically, and without change; it is returned through the veins mechanically, and almost without change: but it is in the capillary system that every secretion is performed; and that the nutrition of every part is effected. The arteries and veins are mere mechanical tubes; these are connected with the vital principle;—they are portions of life itself.

INFLAMMATION.

The arteries are subject to *inflammation*, yet so rarely in the ox as to render it unnecessary to detain us in describing it; but a similar affection of the capillaries constitutes the very essence and the most dangerous part of every other disease. Inflammation is increased action of these vessels. When the increased action is confined to a few capillaries, or a small space, or a single organ, the inflammation is said to be local; but when it embraces the whole of the system, it assumes the name of fever.

If inflammation is the consequence of increased action of the capillaries, the object to be effected by the practitioner is to reduce that inordinate action to the healthy standard, before the part has become debilitated or destroyed by this overwork. Bleeding is one of the most effectual measures, and especially local bleeding. The increased action of the vessels, and the consequent redness, heat and swelling of the part, are at once the consequence of inflammatory action, and tend to prolong and to increase it. A copious bleeding, therefore, by relieving the overloaded vessels, and enabling them, once more, to contract on their contents, is unquestionably indicated. To this physic will follow, and there is scarcely an inflammatory disease in the ox in which it can, by possibility, be injurious. Mashes and cooling diet will be essential.

As to external applications, they will be best treated when the different species of inflammation pass in review before us; but, as a general rule, (for the practitioner will occasionally be puzzled as to the propriety of hot or cold remedies,) in cases of superficial inflammation, and in the early stage of the disease, cold lotions will be the most useful; in cases of deeper-seated injury, and of considerable standing, warm fomentations will be preferable. The first will best succeed in abstracting the inflammatory heat; the other will relax the fibres of the neighbouring parts, which press upon, and perpetuate, the injury, and will also restore the suspended perspiration. Cases, however, will continually occur in which the most opposite treatment will be required in different stages of inflammation.

FEVER.

We have described fever as general capillary action, and with or without any local affection; or it is the consequence of the sympathy of the system with inflammation of some particular part. The first is called *pure* or *idiopathic* fever; the other *symptomatic* fever.

Pure fever is far from being unfrequent in cattle. A beast, yesterday in good health, is observed to-day—dull, the muzzle dry, rumination and grazing having quite ceased, or being carelessly or lazily performed, the flanks heave a little, the root of the horn is unnaturally hot, the pulse is quickened, and is somewhat hard. The owner or the practitioner removes him into the shed, and carefully examines him; the animal is evidently not well, but he cannot discover any local affection or disease; he, however, does that which a prudent man would do, he gives a dose of physic; perhaps he bleeds; he places a mash before his patient, and, on the following day, the beast is considerably better, or well; or possibly, the animal, although apparently better in the morning, becomes worse as the day advances, and, at about the hour, or a little later, when he was seen on the preceding day. What is this but a slight attack of fever without local affection? Who, especially living in woody and undrained districts, has not observed this? This is a species of intermittent fever, still without local determination, and which goes on for three or four days, returning, or being aggravated at a particular hour, until by means of his *cordial purgatives* the practitioner or the owner has broken the chain.

At other times, the fever remains without these intermissions. It increases daily notwithstanding the means that we employ, and at length assumes the form of pleurisy, or enteritis, or some local inflammatory complaint. The general irritation has here concentrated itself on some organ either previously debilitated, or at that time predisposed to take on inflammation. It is pure or idiopathic fever, assuming, after a while, a local determination. This is a serious, and frequently a fatal case; for the whole system having been previously affected, and, probably, debilitated, and disposed to take on inflammatory action, the proper remedies cannot be so fearlessly and successfully used. Local means of abating inflammation must here be pushed to their full extent.

Symptomatic fever is yet more frequent and dangerous. No organ of consequence can be long disordered or inflamed without the neighbouring parts being disturbed, and the whole system gradually sharing in the disturbance. By the degree of this general affection, by the heat of the mouth, and the frequency of the pulse, a judgment is formed not only of the degree of general disturbance, but of the intensity of the local affection. The subsidence of the pulse, and the return of the appetite, and the recommencement of rumination, are hailed as indications both of the diminution of the general irration, and the local cause of it.

Some have denied the existence of this essential fever in horses and cattle, but the facts that have been stated cannot be doubted. Cattle get unwell, they are feverish; a dose of physic is given, they are put on short commons for a day or two, and they are well. At other times they are feverish, and that fever all at once terminates in hoove or pneumonia. In one case, there is fever never becoming associated with local affection; in the other, it speedily terminates in local affection; but, in both, there is, for a while, pure fever. It would be scarcely necessary to recur to this were there not so many instances of bad and dangerous practice in the early treatment of these cases. If fever were plainly recognised, the owner or the surgeon would be more anxious to get rid of the local affection before the system was materially affected; and if he was aware of pure and essential fever, he would endeavour to knock that down before it took on local determination. These are the golden rules of practice, which no nonsensical theories should cause any one for a moment to forget.

INFLAMMATORY FEVER.

Cattle are not merely subject to fever of common intensity, whether pure or symptomatic, but thousands of them fall victims every year to a disease, which, from its virulent character and speedy course, may be termed inflammatory fever. A disease of this character, but known by a number of strange yet not inexpressive terms, is occasionally prevalent, and exceedingly fatal among cattle in every district. It is termed black-quarter, quarter evil, joint murrain, blood-striking, shewt of blood, &c.; and although it may not, at any time, embody all the symptoms of either of these diseases, according, at least, as they are understood in some parts of the country, there are few cases in which the prevailing symptoms of most of them are not exhibited in some of the stages.

Cattle of all descriptions and ages are occasionally subject to inflammatory fever; but young stock, and those that are thriving most rapidly, are its chief victims. So aware is the proprietor of young short-horn cattle of this, that while he is determined to take full advantage of their unrivalled early maturity by turning them on more luxuriant pasture than prudence would always dictate, he endeavours to guard himself by periodical bleeding, or by the insertion of setons in the dewlap of all his yearlings. This disease is sometimes epidemic, that is, the cattle of a certain district have been pushed on too rapidly; they have lurking inflammation about them, or they have a tendency to it; and, by-and-by, comes some change or state of the atmosphere which acts upon this inflammatory predisposition, and the disease runs through the district.

There are few premonitory symptoms of inflammatory fever. Often without any, and generally with very slight indications of previous illness, the animal is found with his neck extended; his head brought, as much as he can effect it, into a horizontal position; the eyes protruding, and red; the muzzle dry; the nostrils expanded; the breath hot; the root of the horn considerably so; the mouth partly open; the tongue enlarged, or apparently so; the pulse full, hard, and from 65 to 70; the breathing quickened and laborious; the flanks violently heaving, and the animal moaning in a low and peculiar way.

Sometimes the animal is in full possession of his senses, but generally there is a degree of unconsciousness of surrounding objects: he will stand for an hour or more without the slightest change of posture, he can scarcely be induced to move, or when compelled to do so, he staggers; and the staggering is principally referrible to the hind-quarters; rumination has ceased, and the appetite is quite gone. After awhile he becomes more uneasy, yet it is oftener a change of posture to ease his tired limbs, than a pawing: at length he lies down, or rather drops; gets up almost immediately; is soon down again; and, debility rapidly increasing, he continues prostrate; sometimes he lies in a comatose state; at others, there are occasional but fruitless efforts to rise. The symptoms rapidly increase: there is no intermission; and the animal dies in twelve or twenty-four hours.

In the majority of cases, and especially if the disease has been properly treated, the animal seems to rally a little, and some of the symptoms appear, from which the common names of the disease derive their origin. The beast attempts to get up: after some attempts he succeeds, but he is sadly lame in one or both of the hind quarters. If he is not yet fallen, he suddenly becomes lame; so lame as to be scarcely able to move. He has *quarter evil—joint murrain.*

This is not always an unfavourable symptom. The disease may be leaving the vital parts for those of less consequence. If the apparent return of strength continues for a day or two, we may encourage some hope, but we must not be sanguine; for it is too often only a temporary and delusive respite.

One of the symptoms now most to be dreaded is the rapid progress of that which has already begun to appear—tenderness on the loins and back. The patient will not bear even the slightest pressure on these parts. The case is worse if to these are added swellings about the shoulders, and back, and loins, with a peculiar crackling emphysematous noise, as if some gas were extricated in the cellular membrane, and the process of decomposition had commenced during the life of the animal. Worse even than this is the appearance of sudden, hard, scurfy patches of what seems to be dead skin. It is a kind of *dry gangrene*, and it is the commencement of a sloughing process, extensive and rapid to an almost inconceivable degree. Now, we have *black quarter*, with all its fearful character.

The ulcers first appear about the belly, the quarters, and the teats, but they spread every where, and particularly about the mouth and muzzle. The mouth is almost invariably ulcerated, and the tongue is blistered and ulcerated too; and there is either a discharge of sanious, offensive, or bloody fluid from the nose and mouth, or considerable hæmorrhage from both of them. Now, the urine, which had before been high-coloured, becomes darker, or bloody; the dung likewise has streaks of blood over it, and both are exceedingly fœtid.

In this state the animal may continue two or three days, until it dies a mass of putridity; unless there has been an honest, active assistant, who never shrinks from his duty—who has some courage and a good stomach—and who will properly dress the ulcers and administer the medicines. Many a beast has been saved even at this point of the disease; and the farmer or the veterinary surgeon should prize such a servant. The first favourable symptom will be a slight diminution of the fœtor—the ulcers will then speedily heal, and the strength return.

The chief appearance after death will be venous congestion every where. The larger and the smaller trunks will be black, and distended almost to bursting. It is a striking illustration of the peculiar vascular system of the animal; and, as will be presently seen, speaks volumes as to the mode of treating this and similar diseases.

The congestion is every where. It affects both of the pleuras, the intercostal and the pulmonary; and the whole substance of the lungs. It extends over the peritoneum, and more particularly over the mucous membrane of the intestines; and patches of inflammation and ulceration are found in every part of the colon. These are the appearances when the animal is carried off during the inflammatory stage of the disease.

If the complaint has assumed a putrid type, there is effusion, the smell of which can scarcely be borne, both in the chest and belly; with adhesion and agglutination of all the small intestines. Often vomicæ in the lungs, and effusion in the pericardium. Every stomach is inflamed, and the fourth ulcerated through. The substance of the liver is broken down. There are ulcerations generally of the smaller, and always of the larger, intestines; and in every part of the cellular membrane there are large patches of inflammation running fast into gangrene.

There cannot be a doubt respecting either the nature or treatment of such a disease. It is, at first, of a purely inflammatory character, but the inflammation is so intense as speedily to destroy the powers of nature. The capillary vessels must have been working with strange activity, in order to fill and to clog every venous canal. The congestion prevails in the cranium as well as in other parts, and the distended vessels press upon the substance of the brain, and that pressure is propagated to the commencement of the nerves; and hence debility, and staggering, and almost perfect insensibility. As the congestion early takes place, the coma, or stupor is early in its appearance.

The nervous energy being thus impeded, the power of locomotion seems first to fail; then general debility succeeds, and at length other parts of the vascular system are involved. The mouths of the excretory ducts can no longer contract on their contents, hence fluid is effused in the chest and in the belly, and in the cellular membrane; and hence, too, the rapid formation of others. The vital powers generally are weakened, and in consequence of this there is the speedy tendency of every excretion to putridity, and the actual commencement of decomposition, while the animal is yet alive. The blood shares in this abstraction or deficiency of vitality, and hence the disposition to ulceration, gangrene, and dissolution, by which the later stages of the disease are characterised.

Inflammatory fever, although not confined to young stock, is far most prevalent among them. It appears principally in the spring and fall of the year, for then we have the early and late flush of grass. On poor ground it is comparatively unknown; but the young and the old stock, in thriving condition, need to be closely watched when the pasture is good and the grass springing. If it is at times epidemic, it is only when the season, or the eagerness of the farmer, have exposed the constitution to an excess of otherwise healthy stimulus; and when the animal is, in a manner, prepared for fever. Some have attributed the disease to an undue quantity of crow-foot, or other acid plants. They are harmless here. It is the excess of healthy stimulus.

When the early part of the spring has been cold and ungenial, and then the warm weather has suddenly set in, nothing is so common as for inflammatory fever to appear; but the change in the temperature, or other qualities of the atmosphere, has had only an indirect effect in producing this; it is the sudden increase of nutriment which has done the mischief. When cattle are moved from a poor to a more luxuriant pasture, if the new grass is sufficiently high, they distend the paunch almost to bursting, and hoove is the result; but if the change is more in the quality than in the quantity of the food, the evil is more slowly produced, and it is more fatal—a disposition to inflammation is excited, which wants but a slight stimulus to kindle into a flame. It is the penalty which the breeder must pay, or the evil which he must carefully, and not always successfully, endeavour to avoid, when he is endeavouring to obtain all the advantage he can from the richness of his pasture, and the aptitude to fatten, and early maturity, of his cattle.

A gentleman who speculated—and with very considerable advantage—in the enclosing of a considerable tract of land, newly recovered from the sea, running down from Wareham towards Poole, bought a dairy of thirty Suffolk cows. They arrived in the very early part of the spring; they were liberally fed on Swedish turnips, and, as soon as it was practicable, they were turned on this maiden and luxuriant pasture. In the course of less than three months twelve of them died. This was rather singular, for milch cows are, generally speaking, exempt from inflammatory fever; and perhaps this circumstance prevented both the owner and the bailiff from tracing the fearful mortality to its true cause.

A veterinary surgeon was sent for from London to inquire into the nature and cause of the disease. There was not a sick animal on the premises, and the only circumstance which could excite attention was, that the cattle looked in much better condition than Suffolk cows usually do, or ought to do. The bailiff was a little jealous of the interference of the veterinarian, and threw no more light upon the subject than he could help; and the veterinarian was, in his turn, cautious and guarded. He expressed a wish to see a little of this fine estate. The request could scarcely be refused, and, indeed, was gratifying; and, soon arriving at a somewhat upland, but still very good pasture, he stopped, and, turning to the bailiff, thus addressed him—'Bleed and physic every one of your remaining cows, and turn them up here; and do not change their pasture until you are forced to do so, and then take care that they shall work a little, in order to obtain their living.' This led to a friendly understanding between them; the nature, the cause, and the remedy of the disease were canvassed; the suggestions of the veterinarian were attended to, and not another animal was lost.

We have known inflammatory fever caused by the driving of fat beasts in the beginning of summer—perhaps no very great distance—but with somewhat too much hurry. It has broken out among stall-fed cattle still later in the year, but only when the process of fattening has been injudiciously hastened. In fact, from the peculiar vascular system of cattle, that excitement which would produce pneumonia, pleurisy, or inflammation of the feet in the horse, is the usual cause of inflammatory fever in them. The weakest part is attacked—the lungs and the feet suffer most from our mismanagement in the horse—the vascular system is most subject to disease in the ox, for we keep him, as nearly as we can with any rational hope of safety, in a state of plethora.

The very name of the disease, *inflammatory fever*, indicates the mode of treatment. In a case of excessive vascular action, the first and most important step is copious depletion. As much blood must be taken as the animal will bear to lose; and the stream must flow on until the beast staggers or threatens to fall. Here, more than in any other disease, there must be no foolish directions about quantities. *As much blood must be taken away as can be got;* for it is only by the bold and persevering use of depletory measures that a malady can be subdued that runs its course so rapidly.

Purging must immediately follow. The Epsom salts are here, as in most inflammatory diseases, the best purgative. A pound and a half, dissolved in water or gruel, and poured down the throat as gently as possible, should be our first dose; and no aromatic should accompany it. If this does not operate in the course of six hours, another pound should be given; and, after that, half-pound doses every six hours until the effect is produced.

At the expiration of the first six hours the patient should be carefully examined. Is there any amendment? Is the pulse slower, softer? If not, he must be bled a second time, and until the circulation is once more affected. If the animal is somewhat better, yet not to the extent that could be wished, the practitioner would be warranted in bleeding again, provided the sinking and fluttering of the pulse does not indicate the commencement of debility.

If the pulse is a little quieted, and purging has taken place, and the animal is somewhat more himself, the treatment should be followed up by the diligent exhibition of sedative medicines. A drachm and a half of digitalis, and one drachm of emetic tartar, and half an ounce of nitre, should be given three times every day; and setons inserted in the dewlap. Those of black hellebore-root are the best, as producing the quickest and the most extensive inflammation. No trouble need be taken about removing the beast now, although he may be in the pasture which has been the cause of all the mischief, for he will not eat until he is very considerably better; and then he cannot be too quickly moved.

If the animal is not seen until the inflammatory stage of the fever has nearly passed, the skill of the practitioner will be put to the test; and yet he will not find much difficulty in deciding how he ought to act. Has the animal been bled at all? if it has not, nothing can excuse the neglect of bleeding now, except debility too palpable to be mistaken. It may perhaps be more truly affirmed, that even that should be no excuse. This congestion of blood is a deadly weight on the constitution, which the powers of unassisted nature will not be able to throw off. It must be very great debility, indeed, which should frighten the practitioner from this course; and debility which, in ninety-nine times out of a hundred, would terminate in death. As a general rule in this stage of the disease, the effect of bleeding should certainly be tried; but cautiously—very cautiously—and with the finger constantly on the pulse. If the pulse gets rounder and softer as the blood flows, the abstraction of blood will assuredly be serviceable, and if the pulse becomes weaker, and more indistinct, no harm will have been done, provided that the orifice is immediately closed.

Physic will, in this stage of the disease, also be indispensable; but double the usual quantity of the aromatic should be added, in order to stimulate the rumen, if the drink should get into it—and also to stimulate the fourth stomach and the whole of the frame, if fortunately it should reach so far as this stomach. A pound of the Epsom salts at first, and half-pound doses afterwards, until the bowels are opened, will be sufficient in this stage; and if, after the fourth dose, (injections having been given in the mean time,) purging is not produced, the quantity of the aromatic, but not of the purgative, may be increased. It is probable that the medicine has found its way into the rumen, where it will remain inert until that cuticular and comparatively insensible stomach is roused to action by the stimulus of the aromatic. No other medicine should be given until the bowels have been opened; and in many cases very little other medicine will afterwards be required.

The bowels having been opened, recourse should be had once more to the pulse. If it indicates any degree of fever, as it sometimes will, (for the apparent debility is not always the consequence of exhaustion, but of vascular congestion,) the physic must be continued, but the constitution would perhaps be too weak for the direct sedative medicine. On the other hand, however, no tonic medicine must be given: the fire must not be kindled afresh after it has been partially subdued. If, however, the pulse is weak, wavering, irregular, giving sufficient intimation that the fever has passed, and debility succeeded, recourse may be had to tonic medicines. The tonics, however, which in such cases would be beneficial in cattle are very few. The exhibition of the mineral tonics has rarely been attended by any satisfactory result—the barks have not always appeared to agree, but in gentian, calombo, and ginger, the practitioner on the diseases of cattle will find almost every thing that he can wish. The two first are excellent stomachics, as well as tonics; the last is a tonic, simply because it is the very best stomachic in the cattle pharmacopœia. They may be given three times every day in doses of a drachm each of the two first, and half a drachm of the last. They will be more effectual in these moderate doses than in the overwhelming quantities in which some administer them, and in which they oppress and cause nausea, rather than stimulate and give appetite. They should always be given in gruel, with half a pint, or even a pint of sound ale.

The practitioner may possibly be called in after ulcers have broken out, and the sloughing process has commenced: there must be no bleeding then; the vitality of the system has received a sufficient shock, and various parts of it are actually decomposing; but physic is necessary, with a double dose of the aromatic, in order to rouse the energies of the digestive system, and to get rid of much offensive and dangerous matter collected in the intestinal canal. Epsom salts will here also constitute the best purgatives. The enlargements about the knee, and elbow, and stifle, and hock, should be fomented with warm water; and any considerable indurations, and especially about the joints, embrocated with equal parts of turpentine, hartshorn, and camphorated spirit.

The ulcers should be carefully and thoroughly washed several times every day with a solution of the chloride of lime, of the strength already recommended. The ulcers about the muzzle, mouth, and throat, should be treated in a similar manner; and a pint of the solution may be horned down twice in the course of the first day. If there is hoose, this will combine with the extricated gas, and prevent the continued formation of it; and it will materially correct the fœtor which pervades the whole of the digestive canal. Mashes and plenty of thick gruel should be offered to the beast, and forced upon him by means of the stomach-pump if he refuses to take it voluntarily. In this case, the pipe should not be introduced more than half-way down the œsophagus, as there will then be greater probability of the liquor flowing on into the fourth stomach.

Tonics should on no account be neglected, but they should not he administered with any nonsensical views of their antiseptic nature, or their changing the properties of the animal fluids, but simply as calculated to rouse to action the languid, or almost lifeless powers of the frame.

If the stench from the ulcers does not abate, the solution of the chloride should be quickly increased to a double strength; but as soon as the fœtor has ceased, and the wounds begin to have a healthy appearance, the healing ointment or the tincture of aloes may be adopted, and the latter is preferable. When the animal begins to eat he should be turned into a field close at hand, the grass of which has been cropped pretty closely. A seton, or a rowel should be retained for three or four weeks; but as for medicine, it cannot be too soon discontinued when the animal is once set on its legs. When art has subdued the disease, nature, although slowly, will most successfully resume her wonted functions.

The breeder has much in his power in the way of prevention. His cattle should be carefully examined every day. Any little heaving at the flanks, or inflammation of the eyes, or heat-bumps on the back, or rubbing, will be regarded with suspicion, and met by a gentle purgative, or the abstraction of a little blood; but the decided appearance of inflammatory fever in one of them will not be misunderstood for a moment, it will convince him that he has been making more haste than good speed, and in the disease of one, he will see the danger of all. All who have been subject to the same predisposing causes of disease, should be bled and physicked, and turned into a field of short and inferior keep.

John Lawrence, whose work on cattle has often been mentioned with respect, expresses himself in his own somewhat peculiar way, but very much to the purpose, on this point. 'Prevention of this malady is the only cure worth notice, because, after the attack, the very nature of the case renders all remedy either uncertain, or of very little profit, even if successful, on account of the expense of time and money. A piece of short or inferior keep should be reserved as *a digesting place*, in which the cattle may be occasionally turned to empty and exercise themselves. Those observed to advance very fast may be bled monthly for several months, of the efficacy of which practice I have, however, by no means so good an opinion as of that of giving medicines which prevent internal obstruction. I am well aware of the difficulty of such measures with a number of cattle in the field, but I am convinced that occasional purges, of alterative medicines, would prevent those diseases which seem to take their rise in over-repletion and accumulation.'

There is a great deal of sterling good sense and practical knowledge in the quotation. The editor perfectly agrees with him in being somewhat afraid of these periodical bleedings. So far as he has had opportunity of observing, they have increased rather than lessened the disposition to make blood and fat. He does not see so much difficulty, but a great deal of good, in the occasional administration of physic; and he regards the *digesting place* and the wearing of a seton, and the frequent, careful examination of the owner or the bailiff, as worth the whole veterinary pharmacopœia.

The editor is far from being certain that he has been enabled to give a description of this disease satisfactory to all his readers, for it differs materially in its symptoms in different districts, and in the same district at different times. The difficulty lies in the other diseases with which the inflammatory fever is combined—sometimes one, and sometimes another, assuming a prominent character, and while they all generally follow inflammatory fever, yet some of them occasionally precede it.

In the North Riding of Yorkshire, the first symptoms are those of *quarter ill.* The cattle are seized first in one quarter, and then in the other. The skin puffs up, and the crackling noise is heard almost from the beginning. The disease is usually fatal when it assumes this form.

In the West Riding, where from the rapidity with which it runs its course is called the *speed*, it also generally begins behind. Inflammation. or rather mortification seizes one hock. It runs up the quarter, which becomes actually putrid in the course of an hour or two, while the other limbs continue sound. Few, and especially young beasts, survive an attack of this kind. Here the active use of local applications is indicated; and yet they will rarely be of much service.

In some parts of Surry, under the name of the *puck*, the fore-quarter, or the side, is the part mostly affected; and the animal frequently dies in an hour or two. On skinning the beast, the whole quarter appears black from the extravasation of blood, and is softened and decomposed as though it were one universal bruise.

Mr. Turner, of Reigate, puts this in a very clear point of view. He says, 'The name (quarter-evil) is indicative only of a variety of it; or, rather, is one of the diseases that connects itself with it: and this disease is generally as completely limited to the quarter attacked as a fit of hemiplegia is to one side of the human being. The animal is generally in the highest possible state of fever; but the quarter-evil is limited to the quarter, which feels, as it is popularly expressed, precisely like a jelly. There is no remedy, but there are many preventives, in which great confidence is placed, and which agree only in being composed of the most powerful stimulants.'

Mr. Trayton has a singular notion about it, yet containing in it some truth. He says, 'that it is caused by cattle feeding on the buds of trees or shrubs in copses and hedge-rows, together with an over-indulgence in ruminating while lying down, whereby they acquire a sluggish habit, and the blood becomes torpid. His preventive is very consistent with this theory, but it is rather a singular one. He says that they should be turned into large enclosures of coarse sharp-bladed grass, and there should be mixed among them colts of a year or two years' growth, which, by their mischievous gambols, will harass the calves thoroughly; and by keeping them in action keep them in health.

None of our readers, we trust, will have recourse to that preventive, which Mr. J. Lawrence describes in his usual happy manner (p. 586.) 'Some skilful leech introduced the following most extraordinary operation as a preventive of the disease, which I apprehend, in the contemplation either of physiology or commonsensology, could have no better prophylactic or preventive view than shaving the animal would have, and which I beg to recommend in its stead, as at least, free from cruelty. The ill-starred beast is cast, bound to a stake, and then all his four legs are cut open from the claws upward to the height of several inches, in order to find among the tendons and ligaments a strong blood-vessel of a bluish colour, guilty of the sin of producing joynt-murrain; and which, being caught with a crooked needle, is cut away. It is a great pity that the abovesaid blue blood-vessel had not been called a worm, since the brains of so many of our cattle-folk have been infested with worms from very high antiquity.'

This disease, there called the *hasty*, was once prevalent in Caithness and many of the Highland Straths; and it was traced to the numerous shrubs which grew on some of their wild pastures, and shaded the coarse grass from the sun until it had attained an enormous growth, and was become of an acrid and stimulating nature. It is added, that when, as agriculture improved, these shrubs were cut down, the herbage became milder and more wholesome, and the disease rarely appeared. The effect may, with greater probability, be attributed to the improvement in the general management of cattle, and the increased knowledge of their constitution and diseases. Indeed, some more accurate knowledge was required of the nature and treatment of the diseases of cattle, when the following absurd and cruel superstition was had recourse to in Caithness, not merely by the peasants but by those who ought to have known better. The beast attacked by black quarter was taken into a byre, or house, into which cattle were never after to enter, the heart was taken out while the animal was alive, and carried into the byre where the farmer kept his cattle, and hung up there; and while it remained there none of the beasts would be attacked by this malady.

They have more harmless superstitions in other countries. A French veterinary surgeon was called on to treat this disease in some cattle. The owner was the more grieved at its breaking out in his farm since he had lately purchased at considerable expense, an amulet that was to ensure the safety of his cattle for ever. The surgeon inquired about this charm, and was told that it had been buried with great ceremony at the door of the cow-house, with the assurance that every animal that passed over it was charmed against the complaint. M. Desplas expressed his determination to dig up this amulet, and see what it was made of. He was entreated not to do so, for certain and sudden death would follow the profane attempt. He obtained the proper instruments, and presently disinterred the awful talisman. It was in the form of a packet; and, on being unfolded, presented a farthing, a little leavened bread, and a bit of wax, wrapped in a small piece of black stuff pilfered from the stole of a priest. M. Desplas placed these sacred things in his museum, and set to work and cured the beast. The enchanter had received a quantity of wheat, worth five francs, and several couples of pullets. It is added (and if descriptive of the lower class of French agriculturists, it is no less so of those of England) that after all, he who had taken the money and had not cured the animal, inspired more confidence than the veterinary surgeon, who, sent by Government, had cured the beast gratuitously.

TYPHUS FEVER.

One other species of fever is yet to be described, that has not been admitted into the sadly incomplete veterinary nosology, but with which every farmer is too well acquainted. It is of a low, chronic, typhoid form. It sometimes follows intense inflammatory action, and then it may be considered as the second stage of that which has just been considered; but often, there have been no previous symptoms of peculiar intensity, at least none that have been observed, but a little increased heat of the ears, horns, and mouth; a pulse of sixty or seventy; a certain degree of dulness; a deficiency of appetite; an occasional suspension of rumination; a disinclination to move; a gait approaching to staggering; and a gradual wasting. These are plain indications that there is a fire burning, and rapidly consuming the strength of the animal. The vital energies are evidently undermining; *but the fire is smothered.* It is not phthisis (consumption,) which will be described in due place; it is not murrain, for the early symptoms of ulceration and decomposition are not found; and it is not inflammatory fever, for the intense inflammation, which has been represented as characterising that malady, is seldom seen—*it is true typhus fever.*

As soon as it becomes established, diarrhœa succeeds; and this is either produced by small doses of medicine from which no danger could be suspected, or it comes on spontaneously. It is not, however, violent, but it continues day after day. It bids defiance to the skill of the most experienced practitioner, or, if it is arrested for a little while, it is sure to return. The discharge is peculiarly fœtid; occasionally mixed with blood, and generally containing a considerable quantity of mucus.

Three or four weeks have probably now elapsed, and then succeed the peculiar symptoms of *low fever* in cattle. Tumours form round the joints or appear on the back or udder; these ulcerate, spread, and become fœtid. The beautiful, sweet breath of the oxen is gone—it is as offensive as the ulcers, and, in fact, we have that which can scarcely be distinguished from the second stage of inflammatory fever.

It is the most prevalent in the spring and fall of the year, and when the first has been ungenial and the latter wet. The pasture generally possesses some degree of luxuriance, although its herbage may be coarse; and the beast is usually in good condition when first attacked by the malady.

This disease has sometimes been epidemic and fatal to a dreadful extent, occasionally assuming the form of, or being connected with, epidemic catarrh; at other times accompanied by dysentery, but frequently being, for many a day, or for some weeks, typhoid fever without any local determination.

The cause of typhoid fever, both in the ruminant and the human being, is involved in much obscurity. Some have accounted for it from the extrication of certain gases or miasmata from vegetable substances undergoing the process of decomposition. Certainly it is most prevalent, on cold, wet lands; and during cold, wet, variable weather. A long wet winter is sure to be followed by typhus fever in every low, marshy district. In the higher pastures, where the cattle seem exposed to greater cold, but have less wet, little of it is seen.

It is much to be doubted whether it is infectious; but all the cattle have been exposed to the same predisposing causes of disease. The farmer would do well to remove the infected beasts from the sound ones as soon as possible; and the carcass of the animal that dies of inflammatory or typhoid fever should be buried without delay.

These are cases which puzzle the farmer and the practitioner too; and, when treated in the best way, they too frequently will not yield to medical skill. There is one rule, however, which cannot mislead. *If there is fire,* *it must be put out.* No apparent debility should mislead here. That debility may, and often does, result from the presence of fever, and not from any dangerous impairment of vital power; and the incubus being thrown off, nature will rally; at all events, the debility is the consequence of the fever, and is daily and rapidly increasing while the fever continues: therefore, the first step is to bleed, and to bleed until the character of the pulse begins to change. It should never be forgotten by the proprietor or the practitioner that one bleeding of this kind will often do good, and cannot be injurious. It is the fear of bleeding lest the animal should be more debilitated, or the pushing on of the bleeding, in order to obtain a definite quantity, after the pulse has begun to falter, that has done all the mischief.

If the heat, and heaving, and disinclination to food should have been relieved by this bleeding, but, a day or two afterwards, should threaten to return, more blood should be taken, but with the same caution as to the pulse.

Physic will naturally follow, but with some caution, too; for it has been already stated that there is a natural tendency to diarrhœa connected with this disease, and which is often troublesome to subdue. One dose of Epsom salts should be given with the usual quantity of aromatic medicine; but the action of this purgative should be secured and kept up by half-pound doses of sulphur, administered as circumstances may indicate.

To this will follow the usual sedative medicine—digitalis, emetic tartar, and nitre. The practitioner must not be deluded here. While the mouth and horns are hot, and the pulse rapid, tonics would be poison: he wants them not at all. *He has to put out the fire, and not to feed it.* When the fever is subdued, but nature finds some difficulty in rallying, we may give our gentian, calumbo, and ginger, with advantage. There are few circumstances in which the cow leech has done so much harm or destroyed so many victims, as when a fire has been smouldering and consuming the energies of life, and he has fed it, and caused it to burst out with resistless force, by means of his abdominal cordials.*

When the tumours and ulcerations appear, the second stage of inflammatory fever is established, and the measures recommended when that malady passed under consideration must be adopted. This disorder attacks cattle of all ages. Full-grown beasts are more subject to typhoid than to inflammatory fever; but among the younger ones and the weaning calves, and those of eight, nine, and ten month's old, it is extremely fatal, for they have not strength to bear up against this secretly-consuming fire.

The mode of prevention, when it first breaks out among the stock, is similar to that of inflammatory fever—namely, to bleed and physic; the grand thing of all, however, is to remove not merely to shorter, but to dryer pasture. With the youngsters, bleeding may, perhaps, be dispensed with; but a dose of physic should be given, and a seton inserted in the dewlap; and the change of pasture should be considered as indispensable.

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* We transcribe the ingredients of a *felon* drink, a name for cold, rheumatism, fever, and various unclassed diseases. It is recommended by Mr. Knowlson, who has been fifty-seven years in full practice. He first describes the disease. The beast's hide is stiff, and not good to get hold of: it loses its flesh; walks stiff in its limbs; its eyes look dim and watery; and it neither eats nor drinks so freely as it should do. Take, for a strong beast, 2 ounces of beast spice, 1 do. turmeric, 1 do. powder of aniseed, 1 do. canary seed in powder, 2 do. ginger in powder, 2 do. grains of Paradise in powder, 1 do. diapente, 1 do. sweet fennel, 1 do. Mithridate. All these are to be mixed together in 2 quarts of ale with a little treacle, and to be given fasting.

The next he calls the *common* felon drink: it is the usual cordial drink of the cow-leech, and administered for almost every disease. Take 2 ounces of beast spice, 1 do. ginger, 1 do. aniseed, 1 do. long pepper, 1 do. diapente, 1 do. Fœnugreek, 1 do. turmeric, 1 do. Mithridate, 1 do. grains of Paradise, 1 do. Galengal, 1 do. carraway seeds.—Can we wonder at the almost uniformly fatal termination of inflammatory diseases in cattle?

Low and damp situations do not agree with ruminants of any kind. After a long, wet winter, there is a strange mortality among the deer in some parks. A wet situation is the acknowledged cause of the most fatal disease to which sheep are subject; and the inhabitants of low, marshy grounds have too often a sad account to render of their cattle.

THE VEINS.

The principal disease of the capillary vessels, including inflammation and the various kinds of fever, having thus been disposed of, the blood must be again traced back to the heart.

By means of the various important functions which are discharged by the capillaries the blood is essentially changed as it traverses them. It becomes black, venous, and no longer capable of sustaining life; and it must be sent back to the heart to be again rendered arterial. The capillaries in which the blood has undergone this change begin to unite, and, when a sufficient number of them have joined their streams, that branch is called a vein. The coats of the vein are much weaker and thinner than those of the artery, and the blood flows through them by a different principle from that which influences the circulation either in the arteries or capillaries.

All the veins of the limbs, or that are subject to the pressure of any of the muscles, have valves, which permit the blood to flow on towards the heart, but oppose an insuperable obstacle to its course in a contrary direction; thus, by the pressure of the muscles, a considerable power is, occasionally at least, called into exercise to propel the blood along the veins. All the veins, however, are not under the influence of these muscles. The large veins of the chest and belly are out of the reach of muscular pressure, and are destitute of this valvular apparatus, but they are acted upon by a more powerful principle.

The heart has been described as an elastic muscle. It has scarcely closed by the stimulus of the organic nerves when it expands again by its own inherent elasticity, and that important principle, by the influence of which the water follows the sucker in the common pump, and rushes in and fills the barrel when the piston is raised in the fire-engine—that principle—the pressure of the atmosphere—acts here, too, and the cavities of the heart are filled again as soon as they expand; and this living pump would work on while there was fluid in circulation. It would be forced in from the nearest and from the most distant veins, in the same manner as the water would flow along the pipes from the most distant reservoir in order to supply the inferior machines—the works of men's hands. Thus the circulation is maintained by the action of the heart, while the blood is passing through the arteries; by the muscular power of the capillaries, while it permeates those little vessels; and by the pressure of the muscles and the valvular apparatus of the veins in some part of its course through them; and by atmospheric pressure, and the principle of the pump, through their whole extent.

VARICOSE VEINS.

The horse, except under the form of bog and blood spavin, and occasional enlargement of the jugular and thigh veins, is free from varicose tumours: in the cow, they seldom appear, except in the veins of the udder, and in the neighbourhood of joints that have suffered even more than usual from the tumours of these parts to which cattle are so liable. An old cow that has been a superior milker, frequently has the veins of the teats permanently enlarged. No application will take down the swelling, but which, however, is rarely productive of any serious inconvenience. The veins of the teats are sometimes much enlarged under *Garget*. Warm fomentations, in order to abate the general inflammation of the bag, will afford most relief. In two cases, however, in the experience of the writer, one connected with garget, and the other not to be traced to any satisfactory cause, there arose a tumor on the bag, evidently containing venous blood. They were superficially situated, and were rapidly increasing. The first was punctured and venous blood flowed out in a full stream, nor could the hæmorrhage be arrested but by the severe application of the cautery, and that applied at a venture, for the precise situation of the bleeding vessel could not be ascertained. Alarmed by this, the operator dissected out the other. He found that two considerable venous trunks poured their blood into a cellated structure, dense within, but the cells increasing in size towards the surface, and communicating with each other. These vessels were secured by a ligature, and the cellular substance was removed, and which, emptied of its blood, shrunk into an unexpectedly small compass.

The varicose enlargement was never removed from the first cow, and occasionally it became hot and tender, and interfered with the milking. The wound presently healed in the second cow, and there was an end of the matter.

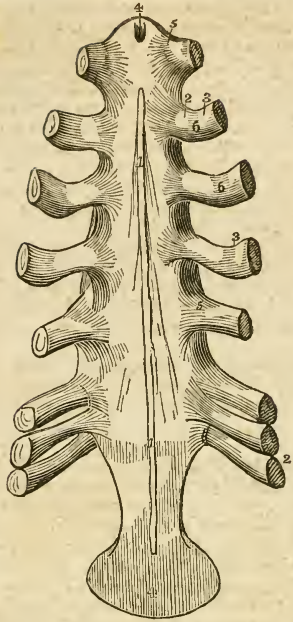
THE CHEST.

The form of the chest is of as much consequence in the ox as in the horse; nay it is of considerably greater moment; for plenty of courage will compensate, to a certain degree, for defects in the form, and for diminution of strength. His own natural spirit will carry many a horse, evidently deficient in physical power, through exertions under which the coward would sink and die. No labour of this kind is required from the ox; but still there are important offices to be performed by the viscera of the chest which demand constant energetic action, over which the mind has no control, and where all depends on the form and extent of the thoracic cavity. The blood must be purified, and it must be circulated through the frame, and that with a rapidity and perfection which must not know a moment's intermission.

The chest consists of 13 ribs on either side, or 26 in the whole; being 10 less than are found in the horse. Of these 8 on each side are, as in the horse, directly connected with the *sternum*, or breast bone, and are termed *true* ribs; the other 5 are attached to cartilages, which are linked together, and also connected with the sternum in an indirect manner—these are termed *false ribs*.

The true ribs are considerably longer, larger, thicker, and farther apart from each other than in the horse; for, in consequence of the smaller number of short, or false ribs, they take a more backward direction, and cover a portion of the abdomen above, while the sternum supports it below.

They are so formed in the ox as to render the cavity of the chest of a far more circular shape than it could be in the horse. The reader is referred, in the first place, to the *sternum*, or breast bone. In the horse, as shown in page 163 of the Treatise on that animal, the breast bone is narrow and deep; it bears no indistinct resemblance to the keel of a ship. It is plainly contrived for the purposes of strength; it opposes its curved form and its depth to the weight which it is destined to support, and the momentum, or force, with which that weight will sometimes be thrown on it in rapid motion.



[*The Breast Bone of the Ox.*]

1. The body of the sternum, (so called from its resemblance in the horse to the stern of a ship) or breast bone.

2. The cartilages by which the ribs are attached to the sternum.

3. The ribs cut off.

4. The xiphoid cartilage (resembling a sword, which it does in the horse) at the posterior part of the sternum, supporting the rumen.

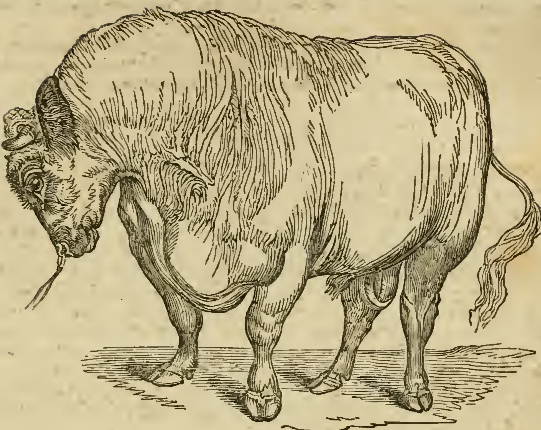
5, 5. The joints, with their capsular ligaments, uniting the cartilages with the sternum.

6. 6. Do., uniting the cartilages with the ribs.

7. The socket receiving the moveable bone at the point of the sternum.

In the ox, as the above cut will show, the sternum is thin and flat. It presents a level surface of considerable width for the floor of the chest, and, therefore, ensures a circular form for the chest, which the horse could never have. It would be a defect in him if he had it, for it would throw too much weight before, and would render him dangerous both to ride and drive.

Breadth at the breast is an essential requisite in the ox. The Lincolnshire ox was one foot and ten inches between the fore legs. It is this conformation alone which will give sufficient surface for the attachment of muscles of the character of those of the ox, and will secure sufficient room for the lungs to purify, and the heart to circulate blood enough for the proper discharge of every function. The following cut of the breast of Firby, Lord Althorp's bull, will afford a practical illustration of these observations.



[*Lord Althorp's Bull.*]

Now comes another illustration of the admirable manner in which different animals are adapted for the purposes which we require of them; and of the economy of nature in giving to each that which he needs, and no more. The horse cannot have this permanently circular chest; for although it would ensure to him a plentiful supply of arterial blood, it would give him a heaviness before, and a general accumulation of muscle and fat which would interfere with his general usefulness: yet that the chest may possess the power of expansion to a certain degree, every rib is attached to the sternum by a perfect joint; and thus the hurried breathing of unusually quickened action is materially assisted. The chest is expanded and contracted much more rapidly, and to a greater extent, and with less expenditure of muscular power, than could be effected without these joints.

The flatness of the breast bone at the base of the chest of the ox secures a *permanent* sufficiency of capacity; and a *perfect* joint between the ribs and the sternum is not only not wanted, but might interfere with the equable action of the respiratory apparatus in this animal. The union, however, between the rib and the sternum does admit of a considerable degree of motion, and would, to a great extent, contribute to the enlargement of the chest, if rapid action, or accident, or disease should require it.

The sternum of the ox has a process projecting very considerably anteriorly, but not closing the entrance into the chest so much as is done in that which is found in the horse. That process, or first division of the sternum, has a joint which is not found in the horse. It admits of a certain degree of lateral action only. It materially assists the walking or other action of the animal, and which appears to be absolutely necessary, when we consider the vast accumulation of flesh and fat about these parts; and especially that singular collection of them, the brisket, scarcely a vestige of which is observed in the horse.

The muscles which are most concerned in giving bulk to the breast are the *transverse pectorals*. They form the grand prominences in front of the chest, and extend from the anterior extremity of the sternum to the middle of the arm.

The great pectoral (fig. 13, pp. 338, 339,) arising from the lateral and the posterior part of the sternum, may be considered more as a continuation of the muscles of the breast, extending laterally and backwards.

THE BRISKET.

This is a singular portion of the breast of the ox, and to which, and very properly, much importance has been universally attached, although, perhaps, on false grounds. It has been considered as a part of the anterior wall of the chest, and as a proof of its depth and capacity. This is altogether erroneous. It is a mere appendix to the chest. It is a projection of substance, partly muscular, but more cellular and fatty, from the anterior and moveable division or head of the sternum, extending sometimes from 12 to 20 inches in front of it, and dipping downwards nearly or quite as much. It is no proof of depth of chest. It is found of a great size in all the improved cattle, varying in size in different breeds, and in different cattle of the same breed; and it was always looked for and valued in the better specimens of the old cattle. It is, at least, a proof of tendency to fatness. A beast that will accumulate so much flesh and fat about the brisket will not be deficient in other points.

In the Lincolnshire ox, the brisket was only 14 inches from the ground. Mr. Mure's Queen of Scots carried her brisket only 15½ inches from the ground.

It is very probable that this may be carried too far. An enormously projecting brisket may evince a more than usual tendency to fatten; but not unfrequently a tendency to accumulate that fat irregularly—to have it too much in patches, and not spread equally over the frame. Many examples of this must present themselves to the recollection of the grazier, and especially in some of the short-horn breeds. In a very few instances it has been almost fancied that this enormously projecting brisket was a defect, rather than an excellence; at least, that it somewhat impaired the uniform beauty of the animal, if it did not diminish his sterling excellence.

The brisket should be prominent as well as deep; perhaps on one account more prominent than deep, for it will then be more likely, either before, or by the time it arrives at the posterior border of the elbow or fore-arm, to have subsided to the thickness of the fatty and other substance naturally covering the sternum. One defect, but not of half the consequence which it is generally supposed to be, would then be avoided—the apparent diminution of the chest at the girthing place, or immediately behind the elbows. Some have evidently considered this to be an actual elevation of the floor of the chest, and a consequent lessening of its capacity at this point; and, on that account, a most serious defect. There are few things which the patrons of the short-horns have laboured more zealously, and generally more unsuccessfully, to remedy. It is certainly a defect, because it evinces a disposition to accumulate fat in a somewhat patchy manner; but it is not so bad as has been represented or feared. It indicates no elevation of the sternum—no diminution of the capacity of the chest: it is a rather too sudden termination of the protuberance of the brisket, either from the accumulation of the the principal part of its substance too forward, or from a want of disposition in the beast to fatten in an equable way. If the brisket were removed, the bicast-bond would be found to be gradually rounding, and rising from this spot, and not let down lower between the elbows. It will be interesting to compare the different forms of the brisket in the different breeds of cattle. The bulls of Mr. Berry and Lord Althorp will show how much variety can exist in different animals, and favourite ones too, of the same breed; and those who recollect the portrait of Mr. C. Colling's Comet, to whose brisket, few, perhaps, could at first reconcile themselves so far as beauty or form was concerned, will be aware of greater variety still.

When the observer now admires or wonders at the protuberant and unwieldy briskets of these cattle, he will recognise the use of the joint in the first, or supplementary, bone of the sternum of oxen. They could not walk with ease, and it would be scarcely possible for them to turn at all, if it were not for the lateral motion which this joint permits. The muscles most concerned in this action, and, indeed, that constitute the bulk of the fleshy part of the brisket, are the anterior portions of the external and internal *sternocostal* muscles (those which are concerned with the sternum and the ribs,) and whose action is to elevate the ribs, and so dilate the chest, and assist in inspiration.

THE RIBS.

The first rib on either side is a short, rather straight, and particularly strong bone. It has much of the head and neck to support; and it is the fulcrum or fixed point on which all the other bones are to move. Each rib is united to the spine by a strength of attachment which will almost rival that of the horse.

They spring from the spine in a more horizontal direction than in the horse; and consequently, there is a provision for the capacity of the chest above as well as below. The ribs of the horse take from the beginning an evident slanting direction. The bones, being more numerous, give greater elasticity and ease of motion by their multiplied joints; the withers, and back, and loins, are narrower, for the convenience of the rider: but in the ox the bones are fewer, in order that they may be larger for the attachment of additional muscle; they spring out at once laterally, taking such a direction as would render them exceedingly awkward for the saddle, in order to secure that permanent capacity of chest which the functions of the ox require.

Therefore it is that in some breeds a little flat-sidedness (the less the better) may be forgiven, because the width of the sternum below, and of the spine, in some degree, but more particularly the *springing out* of the ribs above, secure a sufficient and an unsuspected capacity of chest. It is on this account that the Devon ox is active and profitable while at work, and afterwards grazes kindly. The conformation of the bones which have been just described give him a considerable capacity of chest, notwithstanding his somewhat too flat sides: yet in the animal which was chiefly valued for his grazing properties, something more would be looked for, and would be found.

The shoulder being past, this horizontal projection of the ribs is more and more evident; and, in order that the barrel-form shall be as complete as it can be made, each rib is twisted. Its posterior edges are turned upwards and outwards; and as, proceeding backwards, each projects beyond the preceding one, not only until the eighth true ribs is passed, but also the five false ones, the carcass of a well-made, profitable beast increases in width and in capacity, until we arrive at, or nearly at, the loins. For illustration of this, reference may be made to any or all of the cuts of the Kyloe, Galloway, or New Leicester, or Short-horn cattle.

In point of fact, however, the thorax is now passed, and the abdomen presents itself; but the principle is the same: the ribs are spread out, not only to afford room in the thorax for lungs considerably larger than those of the horse, but for that immense macerating stomach, the rumen, which fills the greater part of the abdomen, and which must be preserved as much as possible from injury and pressure.

THE SPINE.

The principal difference between the spine of the ox and that of the horse consists in the greater size of the individual bones, the small quantity of elastic ligamentous substance interposed between them, and the length and roughness of all the processes in the former. Two objects are accomplished, sufficient strength is obtained for the protection of the parts beneath, and for the purposes for which the animal may be required, and as much roughened surface as possible for the insertion of muscles. As the joints are fewer, some provision seems to be made for this, by their being more complicated than in the horse.

The spinous processes of the anterior bones of the back, constituting the withers, are stronger, but not so long as they are in the horse. While a very slight curve should mark the situation of the withers, the irregularity of the processes of the bones should never be visible. The less the curve the better, and no decided hollow behind should point out the place where the withers terminate, and the more level surface of the back commences. This is a departure from good conformation, for which nothing can compensate. It not only takes away so much substance from the spot on which good flesh and fat should be thickly laid on, but it generally shows an indisposition to accumulate flesh and fat in the right places. The proper form of these parts, however, will be better understood when we describe the fore limbs of the ox; and the spine generally more properly belongs to the cavity of the belly, of which it is the roof. We, therefore, once more go back to the upper part of the neck.

THE LARYNX.

At the posterior part of the pharynx, and at the top of the windpipe, we find a curiously constructed cartilaginous box called *the larynx*. It is the guard of the lungs, lest particles of food, or any injurious substance should penetrate into the air-passages, and it is at the same time the instrument of voice. (See cut 3, p. 325.) Every portion of food, whether swallowed or returned for the purpose of re-mastication, passes over it; and it would be scarcely possible to avoid frequent inconvenience, and danger of suffocation, were it not for a lid or covering to the entrance of this box, termed the epiglottis (fig. 5,) which yields to the pressure of the food passing over it, and lies flat on the entrance into the windpipe, and, being of a cartilaginous structure, rises again by its inherent elasticity as soon as the pellet has been forced along, and permits the animal to breathe again. The whole of the larynx is composed of separate cartilages, to which muscles are attached, that regulate the size of the opening into the windpipe, as the voice or alteration in breathing from exertion or disease, may require. Fig. 11 gives a view of the *rimæ glottidis*, or edge of the *glottis*, or opening into the windpipe. It appears a little more prominent than in the horse, but the opening into the windpipe is considerably smaller than in that animal, because little speed is required in the labour of the ox, and there is rarely any hurried or distressed breathing.

But although the opening into the windpipe is smaller, there is more danger of substances getting into it, for all the food passes thrice over it;

and at its first passage is formed into a very loose and imperfect pellet. Provision is made for this; the epiglottis of the ox is broader than that of the horse: it more than covers the opening into the windpipe. In the horse it merely fits it: and while care is taken that, under ordinary circumstances, the air-passages shall be sufficiently guarded, equal or more care seems to be bestowed on the removal of every impediment to the breathing, and therefore the epiglottis of the horse (fig. 5, cut 1, p. 325,) with its sharp termination, was adjusted so as just to cover the *rimæ glottidis* and no more. In the ox, the breathing is seldom hurried, and the food passes oftener over the opening, and therefore the epiglottis is broad and rounded. (Fig. 5, cut 2, p. 325.)

Not only so, but in the horse the food only passes one way; it is simply swallowed: in the ox it is returned for a second mastication. The provision made for the horse would be totally insufficient, for portions of the food would insinuate itself under the epiglottis, and enter the larynx. In order to prevent this, we have the broad epiglottis, overlapping on either side, and at the angle of the opening; the cartilage of which it is composed is thinner, its rounded extremity is curled—turned back—so as to yield *and be pressed down*, and give an uninterrupted passage, and securely cover the opening when the food is returned, while also, from its thinness, it yields in another way, and *uncurls* and covers the opening when the food is swallowed.*

The arytænöid cartilages (fig. 6) are smaller in the ox than in the horse: the thyröid cartilages (fig. 7) are larger. The interior of the larynx of the ox—the organ of voice—is more simple than in any other domesticated animal. There is neither membrane across the opening, nor are there any duplicatures of membrane resembling sacs within the larynx; in fact, his voice is the least capable of modulation of any of our quadruped servants.

THE WINDPIPE.

The *trachea*, or windpipe, of the cattle is considerably smaller than in the horse, because so much air is not wanted. The ox is not a beast of speed, and he rarely goes beyond the walk or trot. The cartilaginous rings are narrower (fig. 9, cut 2, p. 325,) and although thicker, they are of less firm consistence. The interposed ligamentous substance is weaker (fig. 10, cut 1, p. 325.) It is also wider in the fresh subject although from its thinness and weakness, it quickly contracts as closely as it is represented in this cut. A tube of looser construction is sufficient for the portion of air which the ox needs in respiration; and gathering usually the whole of his food from the ground, and gathering it slowly, and being longer occupied about it, more freedom of motion, and a greater degree of extension is requisite.

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* Some persons have said, and indeed the author is very much inclined to believe it, and his old recollections and present experience confirm that belief, that many of the tongues which in large towns are pickled by the drysalter, and find their way to the tables of the taverns, or of private individuals, never came from the mouth of the ox. The epiglottis, however, will tell tales. It is generally preserved in the pickled tongue; or if it is not, that will be regarded as a very suspicious circumstance. The observation, then, whether this cartilage is rounded and curled, or sharp, will decide the question as to the animal to which it once belonged. One inspection of fig. 5 in the cuts of the larynx in page 325 will prevent all doubt on a subject of some importance to the lovers of good living. It may be added that the tongue of the horse is tied down by the spur of the hyoid bone, and is short and thick. (See fig. 1, in the cut of the larynx of the horse, cut 1, p. 325.) In the ox the spur is a mere tubercle (see cut 2, fig. 1, p. 325,) and the tongue released from this curb is used to clean the whole of the muzzle, and can be insinuated even into the nostril. A short plump tongue, then, until the epiglottis is seen, is a suspicious affair; but a long, ugly looking tongue, with a rounded epiglottis, may be eaten without fear.

In addition to this, it will be observed by the comparative anatomist, and by every one who feels pleasure in comparing the structure of animals with their situation and wants, that there is no careful and intricate overlapping of the cartilages behind as described in 'the Horse,' p. 159; they are simply brought into approximation with each other; and their opposing edges project behind so that they are very loosely bound to the cervical vertebræ. There is also no transverse muscle, because the calibre of the tube can seldom or never be so much varied as in the rapid progression of the horse: but then, by way of compensation, the lining membrane of the trachea is denser and more extensible, and more elastic, and capable of discharging, although imperfectly, a function similar to that of the transverse muscle.

At the lower part of the windpipe there is even a more striking difference; the triangular prolongation of cartilage for the defence of the tube in the immediate neighbourhood of the lungs is smaller, and the additional plates of cartilage given to the horse for the same purpose are altogether wanting. The rings of the windpipe of the ox are about 60, or 8 or 10 more than are usually found in the horse.

TRACHEOTOMY.

Although there are fewer diseases of cattle in which the animal is threatened with suffocation than there are in the horse, yet occasionally in blain, in inflammation of the parotid gland, and in those varieties of fever which in the ox are so much characterized by the formation of tumours, there will be pressure on the windpipe, much contracting its calibre, and rendering the act of respiration laborious, and almost impracticable. In inflammation of the larynx, to which cattle are much exposed, the distressing labour of breathing is scarcely credible.

Tracheotomy, or the formation of an artificial opening into the windpipe, is an operation very easily and safely performed. The beast should be secured, and the hair cut closely from the throat over the windpipe, and opposite to the fifth or sixth ring. The skin is then tightened by the finger and thumb, and an incision is made through it at least three inches in length. This must be carefully dissected off from the parts beneath, and then a portion of the windpipe, half an inch wide, and an inch in length, carefully cut out. There is no occasion for the solicitude required in the horse, that this shall consist of equal quantities of two rings, for any little contraction of the windpipe here would be a matter of no consequence: sufficient speed is not exacted from the ox for roaring to be a nuisance, or even to be perceived. The lips of the wound should be kept open by threads passed through the edges and tied over the neck; until the pressure or inflammation above no longer exists, and then they may be brought together and the wound healed.

It is wonderful what instantaneous and perfect relief this operation affords. The beast that was struggling for breath, and seemed every moment ready to expire, is in a moment himself.

In cases of permanent obstruction, as tumour in the nostrils, or distortion of the larynx or trachea, the animal will generally be consigned to the butcher; but instances may occur in which it is desirable to preserve the beast for the sake of breeding, or for other purposes. Then a tube may be introduced into the opening two or three inches long, curved at the top, and the external orifice turning downward, with a little ring on each side, by which, through the means of tapes, it may be retained in its situation. A horse has worked two or three years wearing a tube of this kind, and a favourite cow or bull might be thus preserved, but extraordinary cases alone would justify such a proceeding.

THE THYMUS GLAND, OR SWEETBREAD.

Before the track of the windpipe is followed into the chest, it may be convenient to notice an irregular glandular body, of a pale pink colour, situated in the very fore part of the thorax, and vulgarly called the sweetbread. In the early period of the life of the fœtus, it is of no considerable size, and is confined mostly to the chest; but during the latter months it strangely develops itself. It protrudes from the thorax; it climbs up on each side of the neck, between the carotids and the trachea, and reaches even to the parotid gland, and becomes a part and portion of that gland. It cannot be separated from the parotid; and when cut into a milky fluid exudes from it.

Very soon after birth, however, a singular change takes place; it spontaneously separates from the parotid; it gradually disappears, beginning from above downwards; and in the course of a few months not a vestige of it remains along the whole of the neck. It then more slowly diminishes within the chest; but at length it disappears there too, and its situation is occupied by the thoracic duct.

It is evidently connected with the existence of the animal previous to birth, and more particularly with the latter stages of fœtal life. It seems to be a part of the nutritive system. It pours a bland and milky fluid through the parotid duct into the mouth, and so into the stomach, in order to habituate the stomach by degrees to the digestive process, and to prepare it for that function on which the life of the animal is to depend; and also to prepare the intestines for the discharge of their duty. When, after birth, it begins to be separated from the parotid gland, it has no means of pouring its secretion into the stomach, and it gradually dwindles away, and disappears.

THE BRONCHIAL TUBES.

The windpipe pursues its course down the neck, until it arrives at the chest. It there somewhat alters its form, and becomes deeper and narrower in order to suit itself to the triangular opening through which it is to pass. It enters the chest, and preserves the same cartilaginous structure until it arrives at the base of the heart, where it separates into two tubes corresponding with the two divisions of the lungs. These are called the *bronchial tubes.* They plunge deep into the substance of the lungs; these presently subdivide; and the subdivision is continued in every direction, until branches of the trachea penetrate every portion of the lungs. These are still air-passages, and they are carrying on the air to its destination for the accomplishment of a vital purpose. The lungs of the ox afford the most satisfactory elucidation of the manner in which these air-tubes traverse that viscus. They can be followed until they almost elude the unassisted sight, but the greater part of them can be evidently traced into the *lobuli*, or little divisions of the substance of the lung which are so evident here. The minute structure of these lobuli has never been demonstrated; but we may safely imagine them to consist of very small cells in which the bronchial tubes terminate, and to which the air is conveyed; and that these cells are divided from each other by exceedingly delicate membranes.

THE ALTERATION OF THE BLOOD.

The blood has already been described as sent from the right ventricle of the heart into the lung, and the blood-vessels dividing and subdividing until they have attained a state of extreme minuteness, and then ramifying over the delicate membrane of these cells. The blood, however, is in a venous state; it is no longer capable of supporting life; and it is forced through the lungs, in order that it may be rendered once more arterial, and capable of supporting life and all its functions. For this purpose these minute veins spread over the delicate membrane of the cells, and for this purpose also the air has been conveyed to these cells by the bronchial tubes.

Now the chemical, it may almost be said, the vital difference, between venous and arterial blood is, that the former is loaded with carbon, and deficient in oxygen. It here comes, if not in absolute contact with atmospheric air, yet so close as to be separated only by a gossamer membrane, which offers little obstacle to the power of chemical affinity or attraction; and the carbon which it contains is attracted by the oxygen which abounds in the atmospheric air, and is taken out of the circulation, and empoisons the air instead of the blood. Carbonic acid gas, or fixed air, is formed by the union of the oxygen and the carbon, the presence of which in undue quantities renders the air destructive to life. The other constituents of the blood have also an affinity for oxygen, and more of that gas is taken from the atmospheric air, and passes through the membrane of the air-cells, and mingles with the blood.

The change, then, from venous to arterial blood consists in the carbon being taken away, and oxygen imbibed; and this is effected by the blood being brought so nearly into contact with atmospheric air, of which oxygen is a constituent part, and which has a greater affinity for carbon, and other principles in the blood, than it has for the gases with which it was combined in the constitution of atmospheric air.

The capillary vessels, now carrying arterial instead of venous blood, unite and form larger and yet larger vessels, until the united stream is poured into the right cavity of the heart, thence to be propelled through the frame. This subject has been treated at somewhat greater length, because the lungs of the ox afford the best illustration of the division of the bronchial tubes, and the separation of the substance of the lungs into distinct lobuli, or little lobes, in which the bronchial tubes terminate, and the air-cells are developed.

CATARRH OR HOOSE.

Anatomical detail may now, for a considerable time, be laid aside, and inquiry be made into the diseases of the respiratory organs. Those only of the first of the air-passages, that of the nose have as yet been considered; however, inflammation has spread beyond the lining membrane of the nasal cavities, and begins to involve the fauces, the glands of the throat, and the upper air-passages generally; it is no longer coryza, but assumes the name of CATARRH, or is better known in the country by the term HOOSE. This is a disease too little regarded by the owner of cattle, but the forerunner of the most frequent and fatal diseases to which they are subject.

It is often hard to say whence catarrh, or common cold, arises. The slightest change of management or of temperature will sometimes produce it. In the beginning of spring, and towards the latter part of autumn, it is particularly prevalent. Young beasts, and cows after calving, are very subject to it. In a great many cases, however, it is the result of mismanagement. When cattle are crowded together they are seldom without hoose. If the cow-house is suffered to be heated to a considerable number of degrees above the temperature of the external air, it is sure to be present there. Many a sad cold is caught at the straw-yard, and particularly by young cattle: the food is scanty there; it is not sufficient to afford proper nourishment, or to keep up the proper warmth; and the more forward drive the others about, and permit them to obtain only a small portion of their proper share of the provender; and then the depressing effects of cold, and wet, and hunger, so debilitate these poor beasts, that they are seldom without catarrh—and that catarrh too frequently runs on to a more serious disease.

Some breeds are more subject to hoose than others. The natives of a southern district are seldom naturalized in a northern and colder clime without several times passing through the ordeal of severe catarrh; and, where the system of breeding *in and in* has been carried to too great an extent, and been pursued in defiance of many a warning, hoose, perpetually occurring, difficult to remove, and degenerating into confirmed phthisis, will painfully, but somewhat too late, convince the farmer of his mistake.

The principal error, however, of the agriculturist is, not that he suffers the causes of hoose to exist, or always gives them existence, but that he underrates the mischievous and fatal character of the disease. To this point we shall have to refer again and again; and if we can but induce him to listen to the dictates of humanity and of interest, the present treatise may rank among those which have diffused some ' useful knowledge.'

There is no disease of a chronic nature by which cattle are so seriously injured, or which is eventually so fatal to them, as hoose; yet not one herdsman in twenty, and very few of those whose interest is more at stake, pay the slightest attention to it. The cow may cough on from week to week, and no one takes notice of it until the quantity of milk is seriously decreasing, or she is rapidly losing flesh, and then medical treatment is generally unavailing. The disease has now reached the chest; the lungs are seriously affected; and the foundation is laid for confirmed consumption.

It is far from the wish of the author to inculcate a system of over-nursing. He knows full well that those cattle are most healthy that are exposed to the usual changes of the weather, yet somewhat sheltered from its greatest inclemency. He would not consider every cow that hooses as a sick animal, and shut her up in some close place, and physic and drench her, but he would endeavour to prevail on the farmer to be a great deal more on the look out. The farmer or the herdsman should be aware of every beast that coughs. It may be only a slight cold, and in a few days may disappear of itself. He may wait and see whether it will unless there are some urgent symptoms; but, these few days having passed, and the cow continuing to hoose, it begins to be imperatively necessary for him to adopt the proper measures, while they may be serviceable.

Let her be taken up and examined. Does she feed as well as ever? Does the dew stand upon her muzzle? Are her flanks perfectly quiet? then one or two nights' housing, and a mash or two, or a dose of physic, may set all right. But if, on examination, the muzzle is a little dry, and the root of the horn hot, and she heaves (although not much) at the flanks, and the coat is not so sleek as usual, and she is a little off her feed, let her be bled. Experience will teach the farmer that these chest affections, in cattle, often and speedily assume a highly inflammable character, and that they must be conquered at the first, or not at all.

To bleeding should succeed a dose of Epsom salts, with half an ounce of ginger in it, to prevent griping and to promote perspiration, and to excite the rumen to action; but none of the hot, stimulating drinks of the cowleech, and of the farmer too, by means of which they cause the fire to burn with tenfold fury, instead of extinguishing it.* To this should be added warmth, warm mashes, warm drinks, warm gruels, and a warm but well ventilated cow-house.

EPIDEMIC CATARRH.

Catarrh occasionally assumes an epidemic form; it spreads over whole districts; it is more than usually violent; it associates with itself the symptoms of other and of worse diseases, and it is strangely fatal. If a cold yet variable spring succeeds to a wet and mild winter, there will be scarcely a dairy or a straw-yard in some districts in which a considerable number of cows will not labour under distressing hoose. Obstinate costiveness attends the early stage of this disease, on which neither Epsom salts, nor common salt, nor linseed oil, can make any impression. All seems to go into the rumen, and has for a while no power on the cuticular coat of that stomach; and then, whether the purgative course is pursued or suspended, diarrhœa suddenly comes on, and bids equal defiance to all astringent medicines. Sometimes, however, diarrhœa is present and obstinate from the very beginning.

Tumours about the head, the roots of the ears, the neck, the back, and loins, and many of the joints, soon succeed, accompanied by a singular crackling sound when pressed upon. There is decomposition going on every where, and in the cellular texture among the rest, accompanied by the extrication of gas, the passage of which among the cells beneath the skin is the cause of this crackling.

While these tumours indicate decomposition in one part, the appearance and odour of the fæces show that it is not inactive in the intestinal canal. The discharge is offensive to a high degree, the breath loses its peculiar and beautiful scent, and the vital powers are rapidly exhausted.

In most of these epidemics, the first attack seems to be made on the powers of organic life, and soon afterwards the animal system shares in the deleterious influence. The beast is unwilling to move; it scarcely can move; it staggers as it walks. It loses flesh every day; the coat stares, and clings to the bones; the appetite is quite gone; a fœtid discharge commences from the mouth and nostrils, and death soon follows.

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* Future ages will scarcely believe that, in the nineteenth century, a work was published on the diseases of cattle, and which had an unexampled sale, in which the following drink is recommended as powerful in removing 'fever and inflammation of the lungs, and diseases of this kind.' There is not a single good ingredient in the whole mixture: there are some inert drugs, and the bulk is made up of absolute poison.

'Take balsam of sulphur, two ounces; Barbadoes tar, one ounce; the yolks of two eggs; heat them well together in a large basin until they are properly incorporated, then add ginger, aniseeds, cummin-seeds, elecampane-root, grains of paradise, and liquorice-root, of each one ounce, in powder. Salt of tartar, half an ounce; honey, four ounces. Mix all together, and add by a little at a time, constantly stirring, one quart of warm ale or gruel. If gruel is used, add a wine-glass of gin or brandy, and give it when new-milk warm.

'If it be given at the commencement of the disease, one or two of the drinks are generally found sufficient to remove the complaint. Its effects are powerful in removing and carrying off the offending humours from the pulmonary vessels, and in restoring them to their proper tone again. It warms, stimulates, and gives fresh action to the stomach and intestines, by which nature will return to its regular course, and the health of the animal be speedily restored.'

This is extracted from Clater's 'Every Man his own Cow-doctor.' We will, however, do justice to the proprietors of that work; they have endeavoured to keep pace with the increasing knowledge of the times; all this, worse than nonsense, is expunged, and the work is now of a respectable character.

The treatment of this disease in its early stage, and when alone it can be treated with reasonable hope of success, may be characterized under two words—promptitude and vigour. The state of inflammatory fever which accompanies the early period of the disease is intense; and unless arrested it will (as we have seen in treating of that disease) speedily exhaust every vital power; therefore, fever existing, bleeding is imperative. The quantity of blood to be abstracted will be regulated by the intensity of the inflammation, the apparent approach or commencement of debility, and the effect produced while the blood continues to flow. All of these circumstances should be most carefully attended to. If the fever rages, the ox will bear to lose a much greater quantity of blood than the horse, and uniformly with manifest advantage. If the state of debility is evidently approaching, or has even commenced, bleeding, regulated by the pulse, and stopped the moment that that falters, will generally be beneficial: but, debility being established, or the bleeding carried on, after the pulse has forbidden it, the abstraction of blood will only hasten the catastrophe.

Aperients should undoubtedly be administered, accompanied or not by aromatics, or the proportion of the aromatic regulated by the preponderance of fever or debility. The sulphate of magnesia will be preferred; and early recourse should be had to the stomach-pump, in the manner which has been already described, should the physic seem to accumulate in the paunch.

The other medicines will also be regulated by the symptoms. While fever continues, the digitalis emetic tartar and nitre will be indicated. When the febrile stage is passed, spirit of nitrous ether, laudanum, gentian, and ginger will be indicated. The cow-house should be warm, yet well ventilated. Mashes should be given, and green meat of every kind, and this changed daily, if necessary, in order to humour the capricious appetite of the patient. The strength being a little renovated, the beast may be turned into some pasture, close at hand, for a few hours during the middle of the day.

THE MALIGNANT EPIDEMIC.—MURRAIN.

Epidemic catarrh much oftener assumes a malignant form in cattle than in horses, on account of the greater vascularity of the system, and intensity of febrile action, and consequent vital exhaustion. It also appears as a disease which is malignant from its very commencement. In former times it was the pest of cattle, while horses comparatively escaped; and, in the present day, there is no disease of the horse, with the exception of farcy and glanders combined, so malignant as the murrain of cattle. It once used to sweep away the horned stock of whole districts, and there are few years in which it is not now seen in some part of the kingdom. It is here ranked under the diseases of the respiratory system, because that system is usually first of all affected, and for a longer or shorter time alone affected; but the disease gradually takes on a typhoid character, and its pestilential influence invades every portion of the frame. It principally appears in marshy and woody districts, or where under-draining has been neglected, or the cattle have been exposed and half-starved.

There are few diseases that assume, in its earlier or later stages, a greater variety of forms; but, disarmed of somewhat of its virulence in modern times, or at least having not appeared in all its terrors for some years past, it will generally be distinguished by some or the greater part of the following symptoms.

There will be cough, frequent and painful, and, in many cases, for a week or more before there is any other marked symptom. The farmer may not always be aware of this, but he will find it out if he inquires about it; and he will be fully aware of the importance of the fact before we have done with this division of our subject.

After a few days some heaving of the flanks will be added to the cough; the pulse will be small, hard, frequent, and sometimes irregular; the mouth hot; the root of the horn cold; the fæces sometimes hard and black, at others liquid and black, and then very fœtid. Presently afterwards, that of which we have to speak again and again, is observed—extreme tenderness along the spine, and particularly over the loins.

The cough becomes more frequent and convulsive, and a brown or bloody matter runs from the nostrils and mouth; the eyes are swelled and weeping; the patient grinds his teeth; there is frequent spasmodic contraction about the nostrils; and the animal rarely lies down, or, if he does, rises again immediately.

The eyes soon afterwards become unusually dull; the pulse remains small, but it has become feeble; the respiration is quicker; the flanks are tucked up; the tenderness on the loins is removed; insensibility is stealing over the frame; and the fæces are more loaded with mucus, and more fœtid. The patient moans and lows, and grinds his teeth almost incessantly; the head is agitated by a convulsive motion; blood begins to mingle with the fæces: the breath, and even the perspiration, become offensive; and the beast staggers as he walks.

Tumours and boils now, or often earlier, appear on various parts. If they are to come forward, the sooner they rise the better, for much depends on what becomes of them. If the animal has sufficient strength for them to go through the usual process of suppuration, although the sloughing and the stench may be greater than could be thought possible, the beast will have a chance to recover; but if there is not energy to bring them forward—if they become stationary—and most assuredly, if they recede and disappear, the patient will die.

The treatment of this disease is most unsatisfactory. If the farmer could be brought to attend more to this cough in cattle—if, here, he had recognised the violent and increasing cough—and, although he had not dreamed of murrain, had bled and physicked the beast on account of the cough, the disease would probably have been arrested, or at least its virulence would have abated.

The early stage even of murrain is one of fever, and the treatment should correspond with this—bleeding. Physic should be cautiously yet not timorously resorted to. For sedative medicines there will rarely be room except the cough should continue. Small doses of purgative medicine, with more of the aromatic than we generally add, will be serviceable, effecting the present purpose, and not hastening or increasing the debility which generally is at hand; but if the bowels are sufficiently open, or diarrhœa should threaten, and yet symptoms of fever should be apparent, no purgative must be given, but the sedatives should be mingled with some vegetable tonic. The peculiar fœtid diarrhœa must be met with astringents, mingled also with vegetable tonics. In combating the pustular and sloughing gangrenous stage, the chloride of lime will be the best external application; while a little of it administered with the other medicines inwardly may possibly lessen the tendency to general decomposition. The external application of it should not be confined to the ulcerated parts alone, but it should be plentifully sprinkled over and about the beast; and the infected animal should be immediately removed from the sound ones.

There is no satisfactory account of the malignant distemper which occasionally appeared in former times, and swept away almost the whole of the cattle in many districts. Those which do exist were written mostly by physicians. They were the best chroniclers, certainly, which the age afforded, but they knew little about cattle either in sickness or health; and were not aware how little many of the principles of human medicine apply either to the theory or the treatment of the diseases of cattle; and (most to be lamented, and most disgraceful to the parties) the farmer would not furnish the physicians with sufficient relations of the symptoms, but purposely misled them, because they had recommended to the government restrictions with regard to these diseased cattle inconsistent with the inattention, prejudice, and fatalism of the owners.

An endeavour will here be made to supply this chasm in the history of cattle, and to collect a connected account of these devastations. It will be useful and not uninteresting as a record, and it will throw considerable light on the nature of the disease which yet remains, but, fortunately for the farmer and his cattle, under an incomparably milder form.

The earliest record we have of murrain is the destruction of the cattle of the Egyptians (Exod. ix. 2, &c.:) 'If thou refuse to let them go, behold the hand of the Lord is upon thy cattle which is in the field; there shall be a very grievous murrain. To-morrow the Lord shall do this thing in the land. And the Lord did that thing on the morrow, and all the cattle of Egypt died.'

During the siege of Troy vast numbers of the cattle of the Greeks, and of the Greeks themselves, are said to have perished by a pestilence. Homer, the father of Grecian poetry, who is supposed to have written about 900 years before Christ, in attributing the disorder to the arrows of Apollo, might have meant only to suggest that the cause of these malignant diseases was in the air: and thus, perhaps, brutes receive the contagion first, because their sense of smell is more acute than that of the human being.*

Hippocrates, who flourished about 500 years after Homer, and is the earliest writer on medicine, while he justly ascribes all disorders to divine agency, yet combats this supernatural and judicial interference, as the offspring of superstition and hypocrisy.†

Plutarch tells us that, during the reign of Romulus, a pestilence, after destroying the fruits of the earth and the cattle, swept off many of the Romans; and Livy, speaking of another visitation of the pest, says that the consuls had the greater difficulty in raising their recruits, because the plague which the year before had raged among the horned cattle had then broken out among the men.‡

Virgil, in his 'Georgics,' by very far the most beautiful of his poems, and containing many good agricultural precepts, which modern improvements have not rendered obsolete, gives a long history of the murrain as it devastated some of the Roman farms.* He wrote about 50 years before the Christian era.

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* 'Ουρῆας μὲν πρωτον ἐπωχετο καὶ κύνας ἀργους
'Αυταρ ἔπειτ' αὐτοισι βέλος ἐχεπευκὲς ἀφιεις
Βάλλ.—Iliad, lib. i.

On mules and dogs th' infection first began,
And last the vengeful arrows fixed in man.—*Pope.*

† Περι ' Ιερης Νȣσȣ.

‡ Delectus consulibus eo difficilior erat, quod pestilentia, quæ priori anno in boves ingruerat, eo verterat in hominum morbos.—Liv. lib. xli.

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* The picture is drawn from the very life, and the reader will forgive the length of some of the extracts.

> Hic quondam morbo cœli miseranda coorta est
> Tempestas, totoque autumni incanduit æstu,
> Et genus omne neci pecudum dedit, omne ferarum,
> Corrupitque lacus, infecit pabula tabo.
> Nec via mortis erat simplex, sed ubi ignea venis
> Omnibus acta sitis miseros adduxerat artus;
> Rursus abundabat fluidus liquor; omniaque in se
> Ossa minutatim morbo collapsa trahebat.
> Sæpe in honore Deum medio stans hostia ad aram,
> Lanea dum nivea circumdatur infula vitta,
> Inter cunctantes cecidit moribunda ministros.
> Aut si quam ferro mactaverat ante sacerdos;
> Inde neque impositis ardent altaria fibris,
> Nec responsa potest consultus reddere vates;
> Ac vix suppositi tinguntur sanguine cultri,
> Summaque jejuna sanie infuscatur arena.
>
> *Georg.* lib. iii. ver. 478, &c.

> Here from the vicious air and sickly skies
> A plague did on the dumb creation rise:
> During th' autumnal heats th' infection grew,
> Tame cattle and the beasts of Nature slew,
> Pois'ning the standing lakes and pools impure;
> Nor was the foodful grass in fields secure.
> Strange death! for, when the thirsty fire had drunk
> Their vital blood, and the dry nerves were shrunk,
> When the contracted limbs were cramp'd, ev'n then
> A wat'rish humour swell'd and ooz'd agen,
> Converting into bane the kindly juice,
> Ordain'd by Nature for a better use.
> The victim ox, that was for altars prest,
> Trimm'd with white ribbons and with garlands drest,
> Sunk of himself, without the God's command,
> Preventing the slow sacrificers' hand.
> Or, by the holy butcher if he fell,
> Th' inspected entrails could no fates foretell;
> Nor laid on altars, did pure flames arise;
> But clouds of mould'ring smoke forbade the sacrifice.
> Scarcely the knife was redden'd with his gore,
> Or the black poison stain'd the sandy floor.—*Dryden.*

It would seem that the disease assumed in that part of Italy the character which it does there, and on the continent generally, at the present day, much oftener, and to a greater extent, than is seen in our country: it is what the French call "Fièvre pernicieux carbonculaire." It is not merely that inflammation of the cellular texture beneath the skin, so peculiarly the disease of cattle, which causes general tenderness wherever the animal is touched, and pain which he cannot bear when he is pressed on the loins; but it proceeds to the formation of tumours, carbuncles, ulcers, and deposit of purulent fluid every where. When the animal is examined after death, no blood follows the knife, but a yellow, or glairy, and pus-like fluid; and this not only immediately beneath the skin, but deep between the muscles. Even during life there is a kind of bloodlessness, and the knife must penetrate deeply in order to find the vital fluid. The latter part of the above quotation refers to this; the former to the effusions either in the thorax or abdomen, which are sometimes found on examining cattle that have died of murrain:

> Hinc lætis vituli vulgo moriuntur in herbis,
> Et dulces animas plena ad præsepia reddunt.
> Hinc canibus blandis rabies venit, et quatit ægros
> Tussis anhela sues, ac faucibus angit obesis.
> Labitur infelix studiorum, atque immemor herbæ
> Victor equus, fontesque avertitur, et pede terram

Our accounts of this disease are now few and meagre for many a century. In the year 376 after Christ, a murrain broke out among the cattle over the whole of Europe. The historian is Cardinal Baronius, who, either deeply imbued with the superstition of the age, or scrupling not to support a noble cause by means unworthy of it, says that 'none escaped but such as were marked on the forehead with the sign of the cross, by which miracle many people were converted to Christianity.'*

In 810 every head of cattle was destroyed in the Emperor Charlemagne's army, and also throughout the greater part of his dominions.† In 1514, and again in 1599,‡ the Venetian states were so ravaged by it, that to pre-

Crebro ferit: demissæ aures: incertes ibidem
Sudor, et ille quidem morituris frigidus: aret
Pellis, et ad tactum tractanti dura resistit,
Hæc ante exitium primis dant signa diebus.
Sin in processu cœpit crudescere morbus,
Tum vero ardentes oculi, atque attractus ab alto
Spiritus interdum gemitu gravis: imaque longo
Ilia singultu tendunt: it naribus ater
Sanguis, et obsessas fauces premit aspera lingua.
Ecce autem duro fumans sub vomere taurus
Concidit, et mixtum spumis vomit ore cruorem,
Extremosque ciet gemitus: it tristis arator,
Mœrentem abjungens fraterna morte juvencum,
Atque opere in medio defixa relinquit aratra.
Non umbræ altorum nemorum, non mollia possunt
Prata movere animum, non qui per saxa volutus
Purior electro campum petit amnis: at ima
Solvuntur latera, atque oculos stupor urguet inertes,
Ad terramque fluit devexo pondere cervix.—

Georg. lib. iii. ver. 494, &c.

The thriven calves in meads their food forsake,
And render their sweet souls before the plenteous rack.
The fawning dog runs mad; the wheezing swine
With coughs is chok'd, and labours from the chine:
The victor horse, forgetful of his food,
The palm renounces, and abhors the flood.
He paws the ground, and on his hanging ears
A doubtful sweat in clammy drops appears:
Parch'd is his hide, and rugged are his hairs.
Such are the symptoms of this young disease;
But in time's process, when his pains increase,
He rolls his mournful eyes; he deeply groans
With patient sobbing, and with manly moans.
He heaves for breath; which from his lungs supplied,
And fetch'd from far, distends his lab'ring side.
To his rough palate his dry tongue succeeds;
And ropy gore he from his nostril bleeds.
The steer who to the yoke was bred to bow
(Studious of tillage, and the crooked plough)
Falls down and dies; and, dying, voids a flood
Of foamy madness, mix'd with clotted blood,
The clown, who cursing Providence, repines,
His mournful fellow from the team disjoins;
With many a groan forsakes his fruitless care,
And in th' unfinish'd furrow leaves the share.
The pining steer nor shades of lofty woods
Nor flow'ry meads, can ease, nor crystal floods
Roll'd from the rock: his flabby flanks decrease:
His eyes are settled in a stupid peace;
His bulk too weighty for his thighs is grown;
And his unwieldy neck hangs drooping down.—*Dryden.*

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* Layard, on the Contagious Distemper among Horned Cattle, p. 11.

† Lancisi de Bovilla Peste. Part III. p. 110.

‡ Rammazini de Contagiosa Boum Epidemia. Ed. Lond. 1717, p. 456.

vent the supposed ill consequences of eating the flesh of tainted beasts, as well as to save the little remnant of cattle that was left, all beef and veal were forbidden by the senate to be eaten throughout their state.

The *Journal des Savans* for 1682 contains an account of an epidemic which destroyed a great number of cattle in most of the provinces of France. The history of its symptoms shows how little was then known of the diseases of cattle, or how careless were the examinations that were made even by scientific men, and for the purpose of enlightening the public. The animals ate and worked as usual until they fell dead in a moment. The explanation of this is a little marvellous, and does not quite agree with the previous story. 'A violet-coloured vesicle is found under the tongue, on which an eschar or scab forms in five or six hours, and on the falling of the eschar, the animal dies; and when he was opened, the intestines were in a state of gangrene, and so was the tongue, for it often fell to pieces.' This was the gloss-anthrax, or blain which has been already described, but of a very malignant character, and associated with murrain, as it is now sometimes found to be; but the marvellous story of the animal dropping all at once betrays inattention or ignorance, or both, and makes us a little cautious how we implicitly trust to the records of those times. The practitioners of that day had, however, a glimpse of the mode of treatment on which alone the slightest dependence can be placed, for they rubbed the part (the vesicle under the tongue) with a piece of silver, *until it bled*, and then they washed the wound with vinegar, well seasoned with pepper and salt.

It was in 1711 that the epidemics commenced, which, although sometimes suspending their ravages for a few years, or rather visiting new districts when they ceased to desolate others, continued to be objects of terror until the establishment of veterinary schools.

The origin of the epidemic of 1711 seems to be clearly traced.* Some cattle-merchants were importing, according to their annual custom, beasts from Dalmatia, which were in request in some parts of Italy. One of these oxen being taken ill, and straying from the herd, was abandoned by the merchants in the neighbourhood of Padua. A servant of the canon of Padua found him, and, whether with or without the knowledge of his master does not appear, took possession of him, and put him into a cow-house among others that were perfectly well. In a few days he died; but not until he had infected every beast; and so surely that they all perished except one, in whose neck setons had been placed.† The contagious nature of the disease (for the contagiousness of true murrain cannot for a moment be doubted,) finding a too powerful auxiliary in some peculiar state of the atmosphere at that time, the malady quickly spread through the whole Venetian territory.

Two Italian physicians, Rammazini and Lancisi, have left us more intelligible and consistent accounts of it than we have of any of the epidemics which speedily followed on the continent of Europe, or of those that occurred in our own country nearly half a century afterwards.

By giving a short sketch of it as it appeared in Italy, there will be less occasion to dilate on the succeeding epidemics of the Continent. It commenced with a shivering fit, followed by unnatural heat, extreme thirst, difficulty of breathing, and general debility. A thick mucous discharge from the nose and mouth speedily succeeded, attended by a very unpleasant smell. There were twitchings of various parts of the frame; frequent fœtid and bloody ejections; and the appetite and ruminations ceased. On the fifth day there was a pustular eruption in the mouth, which covered the tongue and the pharynx; and abscesses followed, and the bones beneath quickly became carious. The cattle died generally on or about the fifth or ninth day.

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* Vid. Rammazini et Lancisi.

† Rammazini de Contagiosa Epidemia, p. 456. See also Hira on the Mortality of Horned Cattle, p. 16.

The hair usually came partly or entirely off. If after the fall of the hair, the skin became firmer; or if the disease attacked the legs or thighs, and there were swellings of the joints, or about the limbs, and which almost prevented the motion of the animal, he generally recovered. Cows that gave milk often survived, but their calves uniformly perished.

On examination after death, hydatids were found in the brain and lungs; and it was said that they contained an infectious gas that could scarcely be endured. If this were the case, they were vesicles formed by the extravasated air in the process of decomposition, and not hydatids. Ulcers were found at the root of the tongue, and gangrene in the intestines. The third stomach always contained a hard, black, infectious mass, which adhered to the lining membrane, and could scarcely be separated from it.

Lancisi says, that he found no medicine effectual against this complaint. Setons and the actual cautery were sometimes serviceable. Rammazini fully confirms this, and says, that the cattle in which either setons or the cautery, or natural tumours and ulcerations, had produced a copious discharge of thick, purulent, and fœtid matter, were the only ones that escaped.*

The pest was soon propagated over the greater part of Italy. It appeared in Milan, under even a more virulent character than it had assumed in the Venetian States; and when it reached the duchy of Ferrara, it had so fearfully acquired strength as it proceeded, that it was the prevalent opinion among the best-informed persons in the duchy, that the whole species of horned cattle would quickly become extinct. As it travelled it selected other victims; horses, deer, swine, and domestic poultry of every kind were attacked by it.

As might be supposed, the most absurd ideas were entertained of its nature and cause. Many of the beasts that had died in the preceding year had not been buried deep enough, and clouds of hornets had burrowed down to them, and fed on the putrid flesh. It was confidently affirmed that a great proportion of the cases of murrain might be traced to the empoisoned stings of these hornets. Some persons pretended to find the black stings of these winged insects in different parts of the animals.†

In 1714, it reached Piedmont, still apparently increasing in malignity. According to Fantoni, Professor of medicine at Turin, more than seventy thousand cattle perished in that little territory.‡

From Piedmont, it easily found its way into France. All the provinces of the south of France, and bordering on Germany, were devastated by it. And now its progress was rapid and murderous to a fearful degree; for before the end of the year it had reached Brabant and Holland; in the latter of which at least two hundred thousand cattle perished; and it had crossed the channel to England, where it was as destructive as on the continent: but of its history and specific character in Great Britain there is not any authentic record.

The disease afterwards began to exhibit new symptoms. If it first attacked the membrane of the nose it sometimes confined its virulence to that and the neighbouring parts, and the malady assumed the precise form of malignant acute glanders. The septum was ulcerated through and through, and the horse and the ox died, in consequence of the local mischief there done, and the constitutional irritation consequent upon it, without determination of the malignant principle to any other part.

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* Vid. Rammazini, et Lancisi in loc.

† Hurtrel d'Arboval (Typhus.)

‡ Ibid.

If the first attack was on the alimentary canal, there the fury of the disease was expended, and the animal was destroyed by dysentery: if the membrane of the mouth was affected, it was soon covered by tumours, of greater or less size, and many of them running on to ulceration.

The extensive ravages of murrain seemed now for a while to cease; but it frequently appeared in certain districts, confining itself to them, but being there murderous enough, and exciting the too well-grounded fear that it would break out again, clothed with all its terrors.

In 1731, the epidemic of 1682 seemed to return. Glossanthrax, or blain, of a malignant character, was prevalent in many of the provinces of France, and very fatal there.

The vesicle formed most rapidly, and, if neglected, suffocated the animal in less than twenty-four hours; or, if the vesicle broke, it was succeeded by a chancrous ulcer, far more corroding than chancres generally are, and which, destroying the tongue and the posterior part of the mouth, produced the death of the animal. The incomprehensible story was again revived, (there were no veterinary surgeons yet,) that the beast continued to eat and to drink, and to appear well, until the tongue fell piecemeal from the mouth.

The cause of the disease was supposed to be the same as in 1682, and it fared even worse with the horse than it did with the ox.

In 1743 and 1744, it appeared again, with increased fury, in the north of France, and great part of Germany.

In 1745, it laid Holland waste a second time. More than 200,000 cattle now perished. In the same year, it again found its way to the coast of Britain. It seems to have been clearly brought to us from Holland, although there are two versions of the story. Dr. Mortimer says that it was imported by means of two white calves which a farmer at Poplar sent for, in order to cross his own breed; and that it spread into Berkshire by means of two cows that were brought out of Essex. The other account is, that one of our tanners bought a parcel of distempered hides in Zealand, and which were forbidden to be sold there, and should have been buried, and so transplanted this dreadful disease among us. "Thus by one man's unlawful gain," says Dr. Layard, "if by this way it was conveyed, the ruin of many graziers and farmers was effected." It is certain, however, that the pest first appeared in the immediate neighbourhood of London, and on the Essex side of the river, and that thence it gradually spread through Essex and Hertfordshire, and the whole of the kingdom.

For more than twelve years it continued to lay waste the country. The number of beasts that were actually destroyed by it was not, and perhaps could not, be ascertained; but, in the third year of the plague, when the government had so seriously taken up the matter as to order that every beast that exhibited the slightest marks of infection should be destroyed, a remuneration being made to the owner, no fewer than 80,000 cattle were slaughtered, besides those which died of the disease, and which formed, according to the narration of one of the commissioners, nearly double that number. In the fourth year of the plague they were destroyed at the rate of 7000 per month, until, from the numerous impositions that were practised, this portion of the preventive regulations was suspended.

In the year 1747, more than 40,000 cattle died in Nottinghamshire and Leicestershire, and in Cheshire 30,000 died in about half a year.

The symptoms of the disease are best described by Drs. Brocklesby and Hird, who, with many other medical men, exerted themselves in the most praiseworthy manner to ascertain the nature and method of cure, or the prevention, at least, of this dreadful malady. Dr. Layard's work is the most laboured performance; but he drew too much from Hippocrates, and Sydenham, and Aldrovandus, and Aretæus, and gives us far too little of the result of his own observation.

The disease generally commenced with a dry, short, husky cough, as it does at the present day; but, as cattle are very subject to hoose, and particularly in the spring and fall, this, although it continued without any other symptoms for eight or ten days, was generally overlooked. At length the coat began to appear unhealthy; the eyes were heavy; rumination ceased; the animal refused all food and drink; the milk began to decrease; it acquired an unpleasant taste; it became yellow, and soon afterwards dried up.

These were precursory symptoms. The real and serious attacks of the disease was a shivering fit, succeeded by an intense heat and uncertain remissions. The eyes became more heavy and dejected, and the conjunctiva inflamed. The cough was now more violent, and respiration so difficult that the animals seemed to struggle and pant for breath.

A swelling became visible externally about the glands of the throat, which, in some cases, became so large as to threaten immediate suffocation. The tongue and internal part of the mouth were hot and slimy; the head hung down; the ears drooped; there was an unusual listlessness and unwillingness to stir; a choice of solitude; a separation from the rest of the herd; and an evident dislike of being, in the slightest degree, disturbed.

The bowels were at first costive, but looseness succeeded in less than forty-eight hours after the shivering fit. The excrement was at first green, watery, and intolerably fœtid; but it afterwards altered to a viscid slimy matter. The purging continued, in fatal cases, through the whole of the disease; in those that recovered, it began to abate about the seventh day. The existence of this looseness for a while was necessary to the favourable termination of the disease; for all in whom it did not appear within a few days after the shivering fit died.

A considerable fœtid discharge proceeded in every case from the nostrils, and, in some instances, from the eyes and mouth. It was thinner, and of a more serous nature in the animals which died of the distemper; but more consistent and better digested in those that recovered.

If the disease terminated fortunately, the inner surface of the mouth, and the glands of the throat continued to have a healthy, inflammatory blush, without any tendency to gangrene or mortification. Internal ulceration was generally regarded as a most unfavourable symptom; but if the external swellings, whether of a greater or less size, which usually appeared, about the third or fourth day, broke, and discharged a great quantity of stinking purulent matter, the beast usually did well, although the ulcers occasionally spread to a most fearful degree, and were always very difficult to heal. Most of the beasts had a universal emphysema, or crackling under the skin, and this in some proceeded to a very strange and curious extent.

The continuance of the disease was very uncertain. Some died almost suddenly; in others, inflammation of the brain seemed to come rapidly on, and the cattle became so furious and dangerous, that it was necessary to destroy them. Most died on the sixth or seventh day, and very few lived on to the eleventh. The approach of death was usually indicated by the mouth becoming cold, the breath fœtid and cadaverous, the eyes sunk in their orbits, the skin tense and clinging to the bones, and especially the horns and teats becoming intensely cold.

The recovery was generally very rapid. On one day a beast appeared in extreme distress, with every symptom urgent, and in less than four-and-twenty hours rumination had returned, the milk flowed free, and of its natural colour, and she turned to the crib with some degree of appetite.

On dissection the paunch was always found very much distended with food. In the second stomach there was nothing unusual; but on the third being cut into, there generally flowed from it a great quantity of thin greenish water, of a most offensive smell. The fourth stomach exhibited marks of inflammation, sometimes running on to gangrene. The intestines had patches of inflammation, or grangrene; but the liver, the spleen, and the kidneys were scarcely affected. The lungs exhibited traces of the intensest inflammation; they were usually congested with blood, while purulent matter ran from every part of the bronchi.

The disease was evidently epidemic. It would cease, in a great degree, towards the approach of summer. During one or two summers, in the twelve years that it raged, it seemed to have altogether disappeared; but at the approach of winter it broke out afresh, sometimes in districts, the cattle of which it had previously thinned; at other times, in places which had hitherto escaped its fury, and very distant from those in which it had seemed gradually to die away. It prevailed most generally and was most fatal towards the latter part of the winter. February and sometimes March were destructive months. There was also a strange caprice about it. It would select its victims here and there. It would carry off half the cattle in every dairy round a certain farm, and not touch a single beast there; but six months afterwards, it would return, and pounce upon this privileged spot, and not leave one animal alive. There were other instances in which, although it attacked the cattle on a certain farm, it readily yielded to the power of medicine, or to that of nature, and not one in a dozen was lost; while on a contiguous farm, the soil, the produce, and the management being apparently the same, not one in a dozen was saved. Its virulence evidently depended on some mysterious atmospheric agency.

Was it contagious as well as epidemic? This seems to have been taken for granted by every one who had opportunity of observing the disease; and on this were founded the orders in council for the non-removal of infected beasts, the slaughter of them, and their burial within three hours after death.

That it was communicable by immediate contact there can be little doubt. The history of its introduction into Padua, and its propagation through the neighbouring territory, were sufficient proofs of this. That it might be communicated in a more indirect way, by the contact of the person or thing that had been near or had touched the deceased animal, was probable enough, and there were said to have been numerous instances of it; but, as is natural in these cases, the public were a great deal more frightened about the matter than the real danger would justify.

The disease had far more of an epidemic than of a contagious character about it; and all that was really necessary, or could be of avail in those cases, (and in the same disease, when it appears in the present day,) was to remove the infected animal from all possible contact with others as soon as possible; to destroy all the litter and forage which was left behind; to burn the less valuable harness or utensils; to scour the place well with chloride of lime; and to forbid those who attended on the sick beasts from having any thing to do with the healthy ones.

The contagion would now be limited in virulence and extent; and, in many cases, it would be altogether destroyed by the plentiful use of the chloride of lime.

It was also very proper to have the carcasses buried as soon as possible. After such diseases the body runs to decomposition very rapidly, and the neighbourhood of a mass of putrid matter cannot at any time be conducive to health.

As to the using for human food the flesh of an animal that had died of such a disease, common decency would forbid it. The law which prohibits the flesh of an animal that had perished by any disease from being eaten, is a very proper one; for it is impossible to say, however strong may be the antiseptic power of the stomach, or the power of converting a semiputrid matter into wholesome nutriment, that injurious effects might not be produced on constitutions debilitated, or predisposed to disease.

There were stories of pigs, and dogs, and ducks having perished in consequence of eating the flesh of an animal that had died of murrain; but, on the other hand, Dr. Brocklesby relates a story of a countryman who had often solicited a butcher to give him a beef-steak: at length the butcher, tired with the fellow's importunities, determined to satisfy his desire, and presented him with a large slice of meat from a beast that had died of murrain. The clown was thankful enough, and soon afterwards he returned with fresh solicitations for such another steak. After three weeks had elapsed, the man was pointed out to Dr. Brocklesby, and was apparently in perfect health; but he certainly did not know what kind of meat he had eaten.

Inoculation for this disease was tried by some celebrated agriculturists, and particularly by Sir William St. Quentin, of Scrampton, in Yorkshire. Eight calves were inoculated; seven of which had the distemper and recovered, and were afterwards turned into a herd of infected cattle, without being diseased a second time.

He likewise inoculated an old ox, which had the distemper from inoculation and recovered. This beast was afterwards turned into a herd of infected cattle, and continued in the pasture with them until they were all dead; he was then put with another herd of infected cattle, but still he escaped.

Dr. Layard produces some singular testimonies to this effect. He speaks of one farmer who had eight cows that survived the distemper in 1746, and which, when the disease was again among his stock in 1749, 1755, and 1756, were in the midst of the sick cattle, lay with them in the same barns, ate of the same fodder, and even of such as the distempered beasts had left and slavered upon, drank after them, and constantly received their breath and steam, without being in the least affected. The farmers were so assured of this, that they were always ready to give an advanced price for those who recovered.

By order of council, boards of health were established in various parts of the kingdom. They had instructions to prevent the sale or removal of cattle from one district to another; to cut off all communication between the healthy and infected parts of the country; to kill every beast that they deemed to be infected, and to see that every beast that died was immediately buried. They were likewise charged with the institution of certain means of cure, and more particularly of prevention.*

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* As a matter of curiosity, we put upon record, the first legislative enactment on such a matter.

First Commission, March 12th, 1745.

His Majesty being desirous of doing all in his power to put a stop to the spreading of the said distemper, has thought it fit, by and with the advice of his privy council (who have consulted physicians and surgeons thereupon, and they have given it as their opinion that all the methods of cure, which have been put in practice both at home and abroad, have proved so unsuccessful, that they have rather contributed to propagate than stop the infection; for while means have been using to save the sick, the disease spread amongst the sound, and is increasing more and more, in proportion to the number seized with it,) to make and establish the rules and regulations following, which his Majesty does, by this order of his privy council, requiring and commanding all his subjects, in the several counties, cities, towns, corporations, and parishes, and all parts of his realm, strictly to pursue and observe, during his royal pleasure.

First. That all cowkeepers, farmers, and owners of any of the said several sorts of cattle, in any place where the said distemper has appeared, or shall hereafter appear, do, as soon as any of the said cattle shall appear to have any signs or marks of the said distemper, immediately remove such cattle to some place distant from the rest, and cause the same to be shot, or otherwise killed, with as little effusion of blood as may be, and the bodies to be immediately buried, with the skin and horns on, at least four feet in depth above the body of the beast so buried, having first cut and slashed the hides thereof from head to tail, and quite round the body, so as to render them of no use.

Secondly. That they do cause all the hay, which such infected cattle have breathed upon, and all the hay, straw, or litter that they have touched or been near, to be forthwith removed and burned; and that no person who shall attend any infected cattle, shall go near the sound ones in the same clothes.

Thirdly. That they do cause the houses, or buildings, where such infected cattle have stood, to be cleared from all dung and filth, and wet gunpowder, pitch, tar, or brimstone, to be burnt or fired in several parts of such buildings, at the same time keeping in the smoke as much as possible; and that the same be afterwards frequently washed with vinegar and warm water; and that no sound cattle be put therein for two months at least.

Fourthly. That they do not suffer any of their cattle that shall have recovered from the said distemper before the notification of this order, to be brought amongst the sound cattle, until they shall have been kept separate a month at least, and until they shall have been well curried and washed with vinegar and warm water.

Fifthly. That no person whatsoever do buy, sell, or expose for sale, the milk, or any part of the flesh or entrails of any such infected cattle; or feed, or cause to be fed, any hog, calf, lamb, or any other animal therewith; or drive, or cause to be drove, any such infected cattle to any fair or market, either in or out of the county where the said cattle now are, or to or from any place whatsoever, out of their own respective ground while they are so distempered.

Sixthly. That no person do drive or remove any of the said sorts of cattle, whether infected or not infected, from any farm or ground, where any such infected cattle are, or shall have been, within the space of one month before such removal.

Seventhly. That as soon as the distemper shall appear in or amongst any of the said sorts of cattle of any cowkeepers, farmers, or other persons, they do immediately give notice thereof to the constable of the town or parish, and also to the churchwardens and overseers of the parish or place where such infected cattle shall be, of the appearance of such infection, or to any inspector to be appointed by the justices of the peace for the district where such parish or place shall be, pursuant to the directions hereinafter given, to the end that the said officers may be the better enabled to do their duty, according to the directions hereinafter mentioned.

That no person do presume to obstruct any constable, churchwarden, or overseer of the poor, or other person, to be appointed by the justices of the peace, to assist in the execution of the powers or directions given, or to be given, in pursuance of this order.

That whosoever shall disobey these said rules, orders, or regulations shall be strictly prosecuted for the penalties inflicted by the said act.

And his Majesty doth further strictly command all constables, churchwardens, and overseers of the poor, and such inspectors, if any shall be appointed as aforesaid, as soon as they shall know, or be informed, that any of the said sorts of cattle, within their respective districts, are infected, to go to, and take an exact account of the number and sorts of such cattle in the possession of any person, distinguishing the infected from such as are not so, and to repeat those accounts weekly; and to see that the infected be shot, They were composed of some of the magistrates of the district, and of physicians who very handsomely proffered their gratuitous services; and they laboured twelve years, and with so little avail, that at length, as it were, by a simultaneous act they dissolved themselves. They could discover no preventive—no cure for the disease—and the restrictions with regard to the sale or removal of cattle, and the communication between different districts were so frequently evaded, that it was either impossible or impolitic to levy the penalties.

There was so much caprice about the disease, and beasts so often recovered after all hope had seemed to have passed away, that the farmers resisted the slaughtering of their cattle, or concealed them when they were sick; and, on the other hand, in ridicule of the competence of these judges, they brought all their old and worn-out animals, or those that were ill of totally different complaints, and had them destroyed, and claimed the remuneration which the government allowed for those that were infected with murrain.

Of the propriety, however, of this bonus for the destruction of infected cattle, there cannot be a doubt; for there were numerous instances in which those who began to kill the sick as soon as the distemper appeared among their cattle, lost very few; but others, who would kill none until their own folly had made them wiser, did not save more than one out of ten.

As to the more strictly medical part of the affair, there were such contradictory opinions among these scientific men—some maintaining that it was an inflammatory fever, and others that it was a bilious fever, and each defending his theory with so much warmth and obstinacy, that the simple farmer was first puzzled and then disgusted; and there were also such different modes of treatment recommended—drugs both for prevention and cure, which either had never been used for the diseases of cattle, or had been proved, even by the beast-leeches of the day, to be perfectly inert in the ruminant; and all evidently founded on conjecture and hypothesis, and borrowing nothing from experience, that, in the language of Dr. Davies, "the graziers found more recover when left to themselves, than when tampered with, and that nature was a better director than an officious pretender." Dr. Layard gives a very curious account of the matter. "Disappointed in their hopes from regular practitioners of physic, they (the farmers) despised all regular methods, and ran headlong after such remedies as were at once to remove every complaint, and were honoured by the authors with the ever-recommending title of *infallibles.* Nor were these remedies more efficacious: tar water, Bate-

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or otherwise killed, as aforesaid, removed, and buried, according to the before mentioned rule; and that all that the other before mentioned rules, orders, and regulations, and such directions as shall be given by the said justices, be punctually performed and obeyed.

And for the encouragement of the owners of such infected cattle, his Majesty doth hereby promise, that they shall be paid by the commissioners of the treasury, for every such infected beast as shall be killed according to these rules, immediately after the affection shall appear upon them, one moiety, or half the value of his such cattle, not exceeding the sum of forty shillings for each of the said sorts, excepting calves, and not exceeding ten shillings for each calf, the numbers, and values, and conformities to the said rules to be ascertained by the oaths of the owner, and two of the said constables, churchwardens, overseers, or inspectors, to be taken before one or two of the said justices, who shall certify under their hands, or the hand of one of them, the sums of money which such owners shall appear to their or his satisfaction to be entitled to, by virtue of this order for infected beasts shot or killed, slashed and buried, according to the above regulations.

And it is hereby further decreed, that for the better notifying of this order, the same be forthwith printed and published, and also inserted in the next London Gazette.

man's drops, Godfrey's cordial, worm powders, and many other things, were all given, and all to no purpose, until bewildered in a labyrinth of opinions, and distracted through their absurd credulity, they became as superstitious in this case for their beasts, as fatalists are with regard to themselves.* They would only bleed and give milk-pottage, because they believed these things innocent; and when by loss of blood or scouring the cattle died, they said that they left the whole to Providence. If they were cured, they said it was well; if they died, they said no one knew any thing of the matter, nor could any thing have done them good."

It is the character of these epidemics gradually to wear themselves out. They are frequent and malignant, and fatal enough at first; but in process of time they become more rare, and more tractable, and at length they disappear; or they select some other country, near or remote, as the scene of devastation. About the year 1758, this epidemic was evidently declining throughout the whole of the kingdom; but it could not be said to have quite left us for several years afterwards.

In 1757, it again appeared in France, assuming a somewhat new character. It was compounded of inflammation of the tissue beneath the skin, shown by the appearance of tumours on every part, associated with acute inflammation of the lungs. It spread from cattle to horses. The poor ass is said, for the first time, to have fallen a victim to it, and these animals perished in great numbers. The stags in the neighbouring forests did not escape; and many flocks of sheep, over which these epidemics usually pass harmlessly, were swept away. The malady yielded to bleeding and purging in the earliest stage; but, being once established, it ran its course in spite of all medical treatment; and the measures adopted usually hastened the catastrophe.

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* For the amusement of our readers, and as a proof of the ignorance of the times, we place upon record some curious preventions and modes of cure.

The infected beast was buried alive in a hole full of mud, with nothing out but its head, for nine hours, when it was taken out quite well.

For every beast seized with murrain, a small round pie was made up, with stiff paste made of flour and butter, as is usually made for mince-pies, and as large as would hold about six ounces of tar. When the tar was put into the pie, it was covered with a lid of the same paste, (it is not said whether or not it was to be baked, nor how it was to be given,) and one given to each beast.

Take a gallon of human urine, if a fortnight or three weeks old the better, put into it ten handfuls of hen's dung. After ten hours' steeping strain it off, and give to each beast a pint and a half of it, throwing into each drink a good handful of rue, bruised or ground.

Take two ounces of assafœtida, the like quantities of garlic, and a handful of rue, beat them together into a kind of paste. A ball thereof, about the size of a walnut, must be put into the ear of the beast, and stitched up. This is strongly recommended by a peer of the realm.

We will add but two remedies more; the one a very pleasant, and the other a very marvellous one.

As soon as the distemper appears in any one or more of the cattle, on any farm, make some good, strong, genuine rum-punch, in proportion to the number of cattle on such farm. Then give every beast one, two, or three half-pints, in proportion to the size of the beast, and that will put an immediate stop to the contagion, or if not, it may be repeated.

A very prevalent practice was to smoke the cattle almost to suffocation, by kindling straw, litter, and other combustible matter about them; and this arose from the following circumstance, which "rests on indisputable authority." An angel was seen to descend in Yorkshire, and to set a large tree on fire. The strange appearance of the thing, or the smell of the smoke, collected the neighbouring cattle around it, whether sound or infected, and those which were infected were immediately cured, and on the others was bestowed an immunity against the disease. The angel did not communicate verbally with any of the people of the district, but he left a *written direction*, that they should catch this supernatural fire, and communicate it from one to another with all possible speed; and that in case, by any unhappy means, it should be extinguished, a new fire of equal virtue might be obtained, by rubbing two pieces of wood together until they caught fire.

For some weeks the whole country was in an uproar, and the sacred fire was communicated from one farmer to another over a very great extent of country.

In 1758, it had spread to Finland. There it assumed another form, modified by the climate, and many local causes. Some cattle were taken all at once. There was violent trembling, amounting almost to convulsion of every limb, and blood ran from the nose, and bloody slime from the mouth, and the animal died in a few hours. In other cases the attack was not so violent; but after the shivering fit, tumours began to form between the thighs, or on the front of the breast, or beneath the jaws; when the jaws were affected, the patient was supposed to be most in danger. Diarrhœa usually followed. If it appeared early, it seemed to be an effort of nature to throw off the evil, and frequently a successful one; if it came on after the second or third day, the beast had not long to live. General bleeding was supposed to be dangerous, except in the very earliest stage of the first species of the disease. Stimulants were thought to be more useful, and particularly free and deep scarifications of the tumours, and the surface of the ulcers.

From Finland the murrain passed into Russia, and was said to be very fatal there; but we have not any satisfactory account of its progress in that country.

Half a century had now elapsed, and, with occasional remissions, and often very short ones, this malignant epidemic had prevailed, and now it had reached the very extremity of Europe. The attention of every government had been anxiously directed to it. Prompted by benevolence, or urged by the hope of honour or reward, the most eminent physicians of the day had devoted their time and medical skill to the elucidation of its nature, cause, and mode of treatment; and all, not only without success, but, it would almost seem, with an unfortunate result; for the malady, continued to spread, although it was not so untractable or murderous.

At length it became evident to the medical men who had fruitlessly laboured to remedy the evil, and to the agriculturist who had suffered so severely by it, that they were contending with the foe at much disadvantage; for they knew not his mode of warfare, nor the source whence he derived his power.

They had not studied—no person had then studied—the anatomy of domesticated animals, or the influence of the conformation of the parts on the discharge of the various functions, or the nature and cause of the diseases of domesticated animals, and the effects of medicines on cattle in health or disease. At length common sense suggested the propriety of the establishment of veterinary schools; and in 1761 the first European veterinary school was established at Lyons, under the superintendence of the justly celebrated Boargelat.

Partly, perhaps, from natural causes, the disease beginning, as we have hinted, to wear itself out in France, but, to a considerable degree, from the diligence and skill of the professors, the ravages of the epidemic were evidently and quickly restrained; and, although it could never be said to have quite disappeared, either in France, or elsewhere, and is yet occasionally far too fatal, yet its victims are, comparatively speaking, few, and it is deprived of most of its terrors. This altered character and decreased devastation of every subsequent epidemic must be traced mainly to one cause—the preventive or curative measures suggested by veterinarians, and the former, perhaps, much more than the latter.

The beneficial consequences of this new study and profession were so manifest, that young men flocked to the school at Lyons, not only from every province in France, but from Switzerland, Sardinia, Austria, Prussia, and even Denmark and Sweden. A second school was established four years afterwards at Alfort, and in process of time a third at Toulouse, and the last was appropriated exclusively to the study of the diseases of cattle and sheep.

Other governments followed the laudable example of that of France; and with the establishment of these schools was not only connected a mitigation of these fatal maladies, but of every disease to which cattle and horses were subject. Last of all (strange that it should have been so,) awakened to a sense of her interest, England established her veterinary school, and devoted it to the same object as the continental ones—the study of the art of preserving the health of all domesticated animals, and *cattle principally.* Unfortunately, the English Veterinary College was established at St. Pancras, too near to the metropolis; and, like the one at Alfort, in the immediate neighbourhood of Paris, the influence of situation prevailed over the most excellent regulations that could be adopted, and the patients became principally, or almost exclusively, horses. In the French school, indeed, the instruction continued to extend to the treatment of all domesticated animals, although the value and effect of that instruction were much diminished by the want of cases illustrative of it, but in the English school; not only were there no horned patients, but not a lecture was given on the anatomy or diseases of cattle; and the pupils were sent where they would of necessity have the ox and the sheep as their patients, without the slightest knowledge of the maladies of either.

A veterinary school has lately, however, been established in Edinburgh, under the patronage of the Highland Society of Scotland, where every thing that it behoves the practitioner to know is taught to the pupil; and, more recently, that excellent and truly liberal institution, the University of London, has admitted a veterinary school under its roof, and, on the same extended plan, embracing every object of the veterinarian's care. The necessary and the beneficial result of this will be, that the diseases of cattle and sheep, hitherto so disgracefully neglected among us, will be better understood, and at no distant period the dreadful annual loss which the country sustains in the death of cattle and sheep, and which has been underrated rather than exaggerated at the commencement of this treatise, will be materially diminished. Why has the Board of Agriculture in England, and the Agricultural Societies of England, so long neglected their duty, while in every continental state the improvement of veterinary science has been an object undeviatingly and successfully pursued? The Highland Society of Scotland is reaping the benefit of its judicious patronage of veterinary science in the increased value of Scottish cattle; and it is to be hoped that the agriculturists of England will not be much longer inattentive to the dictates of interest, reason, and common sense.

Inflammation of the respiratory passages is often confined to particular and to very small portions of them. The posterior part of the mouth, the pharynx, through the funnel-shaped cavity of which the food passes in order to arrive at the gullet, is peculiarly subject to inflammation: it is recognised under the term *sore throat,* and is usually accompanied with cough, and other symptoms of catarrh.

PHARYNGITES—SORE THROAT.

The characteristic symptoms are disinclination to food, suspension of rumination, and difficulty in swallowing. Solid food is either dropped from the mouth when partly masticated, or it is forced down by an evidently painful effort; liquids are generally obstinately refused, or are swallowed by a convulsive kind of gulp. There is tenderness extending from ear to ear, and usually some degree of enlargement in proportion to the inflammation of the neighbouring parts, and especially the parotid glands are involved. Occasionally the irritation of the pharynx produces constriction of its muscles, and a portion of the food, both solid and fluid, is returned through the nostrils. The cough of sore throat is a painful one, and is evidently confined to the throat. It is seldom that this disease is a simple affection in the horse; it is usually combined with catarrh or influenza: it speedily terminates in them; or it is the sympathy of the pharynx with other inflamed parts, and its treatment merges in the treatment of them; except that recourse should be had to local warmth and the application of local stimuli. In cattle it is often a decidedly local affection; there is not the same tendency to take on inflammation in the neighbouring parts produced by ill-usage or mismanagement; the treatment, however, will be the same, viz., bleeding and physic, to abate the general fever, and stimulating embrocations, or even blisters, to subdue the local inflammation.

The great development of the ethmoid and turbinated bones in the nose of the ox, in order to increase the acuteness of smell in that animal, has already been described (vide p. 310:) the consequence of this is, that there is but a small passage left for the air, and when the membrane of the nose occasionally sympathises with that of the pharynx, and becomes inflamed and thickened, there ensues a difficulty of breathing from sore throat which is rarely seen in the horse. It is true that the ox breathes partly through the mouth, but the pharynx itself is constricted and thickened, and the breathing becomes laborious almost to suffocation: therefore sore throat should be considered in a rather more serious light in the ox than in the horse, and be treated with corresponding promptitude.

LARYNGITES—INFLAMMATION OF THE LARYNX.

This is a dreadful disease, and, fortunately, one of rare occurrence. It is inflammation of the lining membrane of the larynx, and is attended by a quickened and loud and laborious breathing that would scarcely be thought credible. In some few exceedingly acute cases the number of respirations equals, or even exceeds, that of the pulse. The least pressure on the neck over the larynx seems to give intense pain. The treatment is here plainly indicated—bleeding, physic, blisters, and, when suffocation actually threatens, trachæotomy.

EPIDEMIC AFFECTION OF THE UPPER AIR PASSAGES.

In low and marshy districts, and a wet, cold, ungenial spring or autumn, there is occasionally an epidemic inflammation of the pharynx, larynx, and windpipe, which differs in some respects from any of the diseases that have yet been described, and is very fatal. The malady commences like most febrile ones, with loss of appetite and suspension of rumination; to these speedily succeed dulness, some prostration of strength, and a slight difficulty of breathing. On the following day, or in the course of a few hours, the throat becomes tender, and it is evidently a little gorged between the channel, and extending some way down the neck. The animal finds difficulty and pain in moving his head or his neck, and also in swallowing the medicines or drinks which are given to him. The engorgement slowly proceeds, or seems to be stationary for a while; the fever acquires no high degree of intensity, but the languor and prostration of strength increase; sometimes there is discharge from the mouth or nose of a purulent character, yellowish-white in colour, fœtid, tinged with blood, and seeming to contain particles of some mucous membrane which has been corroded, and is coming away piecemeal. The disease frequently terminates in suffocation about the fourth or fifth day.

On examination after death, the pharynx is generally filled with this purulent matter, and the membrane beneath is in a state of ulceration, or gangrene. The inflammatory appearance, and the gangrenous one too, extend to a greater or less distance down the gullet; they usually occupy the whole of the larynx, and often a considerable portion of the windpipe, and occasionally may be traced into the bronchial tubes. It is evidently a local affection; it is acute inflammation of the pharynx or the larynx; oftenest of the former, and sometimes of both. The contents of the thorax and the abdomen have usually been free from disease.

Bleeding has been found of little service in this complaint; the manifest object of the practitioner is, either to hasten the suppuration while the surrounding membrane and other parts retain some vital power, or to evacuate the fluid as quickly as possible. For the first purpose blisters of various kinds, and even the heated iron, have been applied to the throat; for the second, the tumour has been lanced, however deeply it may be seated. It requires, however, an experienced veterinary surgeon to conduct any operation here, for the part is crowded with important blood-vessels, the wounding of one of which may be fatal.

When there is no great external enlargement, and yet much difficulty of breathing exists, and suffocation is threatened, there is reason to apprehend that the pharynx, or some factitious pouch which nature has suddenly formed for the fluid, or (yet very rarely, for they are small in the ox) the guttural pouches, or the commencement of the communication between the mouth and the ear, are filled with pus. None but a veterinary surgeon, and a skilful one too, should attempt an opening in such a case. The following hints may be some guide to the young veterinarian.

PUNCTURING THE PHARYNX.

The beast must be cast, and properly secured. This must be effected with as little violence as possible, for in the struggles of the animal, and the sudden quickening of the breathing, suffocation may ensue in a moment. If there is a little greater enlargement on one side than on the other, the animal should be cast with that side upwards. The operator should now have the head of the patient moderately extended, and then he will ascertain the situation of the middle of the anterior edge of the atlas, or first bone of the neck (vide *n.*, p. 272.) Close upon this, or connected with it, he will find the posterior edge of the parotid gland. He should elevate the skin, and, taking the edge of the atlas as a guide, and following its direction, he should make his incision about two, or not exceeding three inches in length, but no deeper than the skin and the cellular substance, and the centre of his incision should answer to the centre of the rounded edge of the atlas. A thin layer, partly muscular and partly fibrous, will now present itself. It belongs to the subcutaneous muscle of the neck, and it lies upon the parotid gland. He should dissect through it carefully, and if his first incision has been a correct one, he will come upon the posterior edge of the parotid gland. This he must separate cautiously from the atlas, and from the cellular tissue by which it is tied down, and elevate, or turn it aside, as far as the middle of the space which separates the atlas from the mastoid process.

The forefinger must now be introduced into the opening. There is first felt a layer of soft parts, and then the superior lateral branch of the hyoid bone, from the extremity of which a flat muscle—the stylo-hyoideus (fig. 13, p. 332)—goes to the styloid process of the occipital bone. Immediately under this muscle lies that portion of the pharynx which is connected with the Eustachian tube; and now, the back of the instrument being turned towards, or touching the parotid gland, and the edge of it towards the ear, and the head being somewhat more extended in order to change a little the situation of the carotids and nerves, the bistoury is plunged through the muscle into the pharynx beneath.

Sometimes the whole of the fluid cannot be evacuated through this first incision, and a new one must be sought in a more dependent direction. A curved sound must be introduced into the first orifice, and the end of it made to press against different parts of the cavity, until it can be plainly felt externally between the bifurcation of the jugular: every important vessel and nerve will be in this way pushed aside, and the point of the sound may be cut down upon without danger.

BRONCHITIS.

When catarrh begins to spread, and to involve the lower and more important air-passages, it attacks the bronchial tubes oftener than any other portion of the respiratory apparatus. That which would become inflammation of the substance of the lungs in the horse, is a similar affection of the lower and minuter air-passages in cattle. We are unable to assign any satisfactory reason for this, but it is an important pathological fact. It used to be called inflammation of the lungs in cattle, and is so considered by the majority of farmers and cowleeches; but since the improvement of veterinary science, this distinction, and one of some moment, has been established. Bronchitis, however, is seldom pure, it is the prevailing disease, but it is complicated with slighter inflammation of the neighbouring substance of the lungs. Bronchitis is rarely sudden in its attack. It is preceded, and generally for a long time, by cough—cough becoming more and more frequent and painful, and husky and wheezing.

Here, then, is another motive for attention to the hoose of cattle. Catarrh, simply as catarrh, may do little harm; but the inflammatory affection will gradually involve other and more important membranes, inflammation of which is generally fatal. Bronchitis is the intermediate step between catarrh and consumption, and it unfortunately is that step which, if once taken, the other must follow. We may, therefore, except when the disease assumes an epidemic character, (which it not unfrequently does, and particularly in young cattle,) attribute it to the neglect or mismanagement of the herdsman or the owner.

The existence of bronchitis may usually be detected by a gradual change of the countenance; a sunken, anxious, haggard look; a rapid and laborious breathing, attributable, at first glance, to something more than mere catarrh, however severe that may occasionally be; a cough, painful to a very great degree, and against the full action of which the animal strives as much as he is able, so that it is not full and perfect, but *husky* and *wheezing*. There is a very considerable disinclination to move, which is easily accounted for; for inflammation of the bronchial membrane is accompanied by thickening of it, and by the secretion of a quantity of viscid mucus, so that the passages are, to a considerable degree, obstructed. This gives a consciousness of the danger of suffocation, and occasionally the disease terminates in suffocation. The slightest motion aggravates the cough; and motion of a sudden kind sadly oppresses and terrifies the animal. The breath, passing over so great an extent of inflamed surface, is evidently hot. The seat of inflammation being deep, no pain is indicated when the side of the animal is pressed upon, or lightly struck; and for the same reason the animal does not gaze anxiously at its sides. In addition to this, and most important of all, and marking the fatal progress of the disease, the animal loses flesh rapidly, and to a very great extent; the patient becomes a mere skeleton, and has not been unaptly described as crawling about with merely a dry skin covering a set of creaking bones.

To young cattle bronchitis is particularly destructive, and the symptoms and accompanying circumstances are very singular. A yearling is often observed to have a cough peculiarly distressing. If he is bled, and setoned, and physicked, the symptoms will sometimes rapidly abate, particularly, some think, if the worm-drink of the village doctress is administered; but in most cases remedial measures are applied in vain. The cough continues as distressing as ever. The intermissions are short, and the paroxysms exceedingly violent. The beast is off his feed, hidebound, his belly tucked up, his coat staring, his flank heaving, and it is painful to hear him cough. This occurs principally on low, marshy woody lands.

The animal at length dies, and the whole of the bronchial passages are found to be completely choked up with worms. They are of the *strongylus* species, and mostly the *filaria.* Many of them are also found in the windpipe; and the mucous membrane both of the windpipe and the bronchial passage presents an appearance of the intensest inflammation.

The generation of these parasitical insects will be best discussed when the worms that infest other passages are described: it will be sufficient to observe, at present, that worms are oftenest found in an injurious quantity in a moist state of the atmosphere, or in moist situations, and especially in those which abundantly produce the vegetables and grasses peculiar to such a locality; and also in young subjects, and in those whose constitution is somewhat enfeebled. All these predisposing causes are present here; but the origin of the worm—whether the eggs possibly floating in the atmosphere, or contained in the food or drink of the animal, find their proper and destined nidus in the vitiated secretion of the inflamed mucous membrane of the trachea or bronchi, and are there hatched into life; or the membrane is irritated and inflamed by the presence of these parasites, deposited ere the part was diseased;—these are questions which will be better solved by-and-by.*

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* The ravages of bronchitis in cattle are not confined to our country. The author has lately been favoured with an account of the same disease, but with a somewhat different character, as it prevails among and destroys thousands of the cattle of Jamaica every year. It is essentially the bronchitis of great Britain, modified by difference of climate; and miliary tubercles also usurping the place of the strongyli. It is most prevalent in low marshy situations, but it is frequent and fatal in all the West India islands. Young cattle are peculiarly subject to it; but it attacks beasts of every age. It is so fatal that no means of cure are attempted; but as soon as a beast begins to cough he is slaughtered, if in tolerable condition; or he is got into condition as quickly as possible, and destroyed. Cattle so attacked are called *cough cattle*, and there are droves of them upon every plantation of considerable size, with negroes, whose proper business it is to attend to them, and who change them about among the best pasturage that the plantation will afford.

Upon dissection, the fine delicate membrane lining the windpipe, especially about the end next the fauces, is studded and thickly covered with a semi-organized deposition, to the eye like hydatids, but fixed to the membrane itself, and not hanging down like the grape bunch; these are of various sizes, resembling herring-roe, or fish-spawn. On being cut into, a substance may be turned out of a gritty calculous description, so firmly connected with the cyst that contains it, as scarcely to be separated. This substance may be traced partially along the canal of the whole tube, and extending to the bronchi, and imbedding itself eventually in the substance of the lungs, where alone it appears to be accompanied by purulent matter, or pus of a yellow thick consistence. It is found in various parts of the lungs; sometimes in their substance, and also adhering to the pleura externally, and to the pleura costalis, where some degree of vascularity is evident. In

Bronchitis, when not attended with all the violent symptoms that characterise the existence of worms in young cattle, should be treated like other inflammatory complaints. Bleeding will, as usual, be the first remedy, and it should be carried to the extent which the pulse will allow; in general, however, the ox will not, in this complaint, bear the loss of so much blood as in other chest affections. To this should follow physic, and the sedative medicines already recommended, with mashes, &c.

In some cases a favourable termination of the case has been produced; but in the bronchitis with worms there are exceedingly few cases of successful treatment. The farmer is so convinced of the almost uniform fatality of the malady, that he either slaughters the animal at once or suffers him to take his chance. He may, perhaps, apply to some old woman in his own or the neighbouring parish, who has an infallible drink for all the diseases of cattle, but he rarely has recourse to the veterinary surgeon.

Can nothing then be done? Is there no drug that can be brought to bear upon these worms? None directly; for not only no fluid destructive to the worms, no fluid of a poisonous nature, can be introduced into the trachea and bronchi, but no fluid at all can pass into these tubes. Can any gas, then, of a deleterious character be breathed, not in sufficient quantity to injure the beast, and yet with a chance of destroying the vermin? Diluted chlorine gas might be inhaled. It might be breathed more readily, and would not be arrested by the watchful sentinels in the nasal cavities and the larynx, if an artificial opening were made into the larynx. Other symptoms of bronchitis, and particularly the feeling of suffocation, might also be relieved or removed by this.

The animal would, probably, be much annoyed by such inhalation; he might cough for a while with even greater violence; but the worms dying, or their hold being loosened, they might be expelled through the natural or artificial opening by the very urgency of the cough. That veterinary surgeon or agriculturist would deserve well of his country who puts this fairly to the test.

There is another mode of going to work, and one that promises occasional success. There are certain drugs that are taken up by the lacteals, or by some of the absorbent vessels, and carried into the circulation and produce their effect by immediate contact with the part on which they operate. Thus mercury acts in various local diseases; iodine lessens the growth of many tumours; and turpentine is a diuretic. Turpentine is peculiarly destructive to worms. It most effectually expels the tape-worm from the human being; and it often produces the expulsion of vast quantities of the round worm from the horse. It also enters into every part of the circulation: it is recognisable in the urine and in the breath. Can it, through the medium of the circulation, be brought into contact with these worms? It is worth the trial.

Are there no medicines that promote expectoration in cattle, *i. e.* which loosen the morbidly viscid mucus secreted in these tubes, and cause it to be more easily discharged in the act of coughing? There is no doubt

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traversing the windpipe small worms are frequently discovered, like the end of a thread, and of the shape of ascarides; but whether they are the effect of accident, or connected with the disease, does not clearly appear, for very few are found, and they are not always present. Tubercles containing the same gritty substance are found in various parts of the liver.

In some cases this morbid appearance is not found in the upper part of the windpipe, nor are there any signs of its having existed there; but about the bifurcation of that tube, and the commencement of the bronchi. Many flukes are often found in the liver. —*Private Letter.*

that certain drugs effect this purpose in the human being; the exhalents of the bronchi, under their influence, pour out an increased quantity of mucus, far less adhesive in its nature, and expelled with little difficulty. Some practitioners are so much in the habit of mingling numerous drugs in the same ball, or drink, that they cannot be assured of the precise effect of each; and others, from an equally erroneous habit of contracting their pharmacopœia, and shunning almost every drug in which the human practitioner places confidence, have made few well-conducted experiments on the power of different medicines even on the horse, and none on those which are administered to cattle. The turpentine should take the precedence in any trial that may be made to expel the strongyli from the bronchi; and, that failing, it might be worth while to experiment on the effect of squills, or the gum benzoin, or the balsams of Peru and Tolu.

INFLAMMATION OF THE LUNGS.

The beautiful appearance of the *lights* or lungs, in cattle, compared with those of the horse, will sufficiently prove that these animals are, comparatively, seldom subject to pure inflammation of the lungs. It has been acknowledged, however, that, to a certain extent, it accompanies bronchitis; for, when the membrane of the air-passages is inflamed, it is to be expected that the air-cells in which these passages terminate will not quite escape.

The substance of the lungs is made up of thousands of these little cells or pouches, into which, as has been already stated, the air is at length conducted; and over the delicate membranes constituting the divisions of which, myriads of minute vessels are ramifying, and where the blood undergoes its important change. It is easy to imagine that this membrane, so delicate, and so loaded with blood-vessels, must be subject to inflammation, and that of an exceedingly dangerous character.

Still, however, these air-cells are not so often the seat of inflammation in cattle as might on first consideration be imagined. There are exciting causes enough of inflammation in the air-passages from exposure to the inclemency of the weather, and from the general bad management to which cattle are subject; and this may run on to the formation of tubercles and ulcers, and death; but there is not the irregularity of exercise—the sudden and exorbitant demand for arterialized blood—the rushing of the blood through these minute vessels—the distension, the labour, the rupture of them, and their consequent disposition to inflammation. They are different parts of the lungs which are exposed to danger in the two species of animals; and this sufficiently accounts for the different character of disease.

Until lately all chest affections were confounded under the term pneumonia, or inflammation of the lungs; and there is no reason for pushing our distinctions too far, except that it is satisfactory to know the precise nature of the disease which destroys our cattle, for that will probably lead us to the discovery of the actual cause of the malady, different as we see here in bronchitis and pneumonia. It may also lead to minute, yet important differences in the treatment of disease, as we shall have to point out in the present case.

Pneumonia occasionally attacks all cattle, but more particularly working beasts, and those that have been driven a long way, or that have been unnecessarily hurried on a journey of a considerable length. The disease usually appears at the distance of some hours, or a day or two, from the exciting cause of it, and can generally be clearly traced to that cause. In the catching weather of harvest, in the haste to get the manure on the ground when a sharp hoar-frost suddenly appears and that does not seem likely to last long, and in the hurrying from fair to fair when the markets follow each other closely in distant parts of the district—we trace evident causes of pneumonia. The beast is dull—the head is extended or drooping—grazing and rumination have ceased. The flanks heave, but not so laboriously as in bronchitis. There is cough frequent—sore, but not so frequent, nor so urgent, nor so painful as that of bronchitis. The mouth is hot, but the horns and ears and feet are cold—deathy cold. The animal will not lie down—he will scarcely move, but more from inability to move because he wants the use of the muscles for other purposes, than from fear of suffocation—and he plainly and anxiously points out the seat of disease by looking at one or both flanks. Pneumonia, then, would be easily distinguished from the disease which has been just treated of, and from pleurisy, which will next come under consideration, if the symptoms of the maladies of cattle were but a little more attended to than they generally are.

The treatment will vary in some minute particulars. Bleeding will be indicated, and as early as possible, and, pursuing the old rule, the blood should flow until the pulse is affected. A much greater quantity will be abstracted in this disease than in bronchitis, because the animal will bear up, or struggle with the loss of blood. In a membrane so vascular as that which lines the air-cells, the inflammation will often be so intense that it will not yield to one bleeding, and the progress of the disease must therefore be watched with this view.

Physic will be as plainly indicated as in bronchitis; and in despite of a very proper fear about its being carried too far in the horse, and producing a more untractable disease in the abdominal cavity, physic may be given to cattle in pneumonia, generally with advantage, and always without apprehension. It should, however, be of an unirritating kind. The purgative effect should be first produced by the Epsom salts, and kept up by sulphur. In an acute inflamation, like that of the lungs, it is necessary that the physic should act speedily, and yet it may amazingly accumulate in the rumen. The practitioner hardly dare to unite with it much aromatic or stimulating matter in order to rouse this comparatively insensible viscus to action, but he must have speedy recourse to the stomach-pump in the way already pointed out.

Blisters will here be especially indicated. The inflammation is no longer that of the air-passages deep in the substance of the lungs, but of their terminations, upon the surface of the lungs, as well as every where else. It is difficult to cause a blister to rise on the thick skin of the ox; yet the common blister-ointment, thoroughly rubbed in, will occasionally have effect. The turpentine tincture of cantharides, repeatedly applied, will cause considerable swelling; or, both of these failing, there remain, in bad cases, boiling water and the hot iron at the command of the surgeon. Setons in the dewlaps should never be omitted.

The same attention to diet is requisite as in other acute inflammations of the chest.

ACUTE AND EPIDEMIC PNEUMONIA.

An acute species of pneumonia in cattle is sometimes met with, and it occasionally appears as an epidemic. The beast hangs his head—there is dryness of the muzzle—the mouth and breath are hot—the flanks more or less agitated—there is a hard, dry, and frequent cough—the appetite is gone, but the thirst is excessive—the excrement is solid and black, or liquid, black, and fetid—the coat rough—the horns and ears hot, or alternately hot and cold—there is languor and apparent weakness, and sometimes direct lameness, and most frequently of one of the hind legs.

To these rapidly succeed other symptoms—that tenderness along the spine and the whole of the lumbar region which has been again and again described as so characteristic of almost every inflammatory disease of cattle; the head is now stretched out—the eyes are unnaturally bright, yet weeping—there is grinding of the teeth—the mouth and breath become hotter—a mucous, or sometimes purulent discharge runs from the mouth and nostrils, at first clear, but soon becoming brown, red, or bloody—the flanks heave more violently—the cough is more urgent—it has become convulsive—the nostrils dilate and contract with spasmodic violence—the animal no longer lies down, or if he does, rises again immediately—sweats break out on different parts of the body—the temperature of different parts varies, and very curiously changes—the secretion of milk is suspended, but the teats become hard and swelled—tumours appear on various parts—a shivering, partial or total, succeeds, and the tumours disappear, but they speedily rise again and are more permanent. Possibly some of the most urgent of the symptoms remit when the tumours begin to appear, but towards night an exacerbation succeeds, which does not subside until the morning.

The prostration of strength increases—the belly is tucked up and corded—the flanks heave with greater violence—the back and loins become bowed—the limbs are drawn together towards the centre of gravity—the stools are liquid and fetid, and accompanied by much straining and tenesmus—the sensibility of the loins is now subsided—the sensibility generally is almost gone—the flies collect about the beast, and he makes no effort to drive them away—every irritant ceases to act upon the skin—the respiration is quickened, and more and more laborious—it is accompanied by a gurgling noise in the chest, distinctly heard even without the application of the ear to the side—the nostrils become yet more dilated, and the mucus flowing from them varies in colour, but exhales a cadaverous, infectious odour—the breath is now become cold, and is as offensive as the discharge—the pupil of the eye becomes dilated—an offensive secretion proceeds from the lids, and the animal is evidently becoming blind—the prostration of strength still goes on—the beast falls—he perhaps rises again for a litte while—and then falls and dies.

The disease is sometimes rapid in its progress, and the animal is destroyed in twenty-four or eight-and-forty hours after the first attack. This is particularly the case with young cattle, and those that are in good condition. At other times, the beast lingers on six or seven days.

On examination after death, the lungs are gorged and black with blood, they are softened, and easily torn; they, however, contain some spots of hepatization, or condensed substances, and often abscesses filled with pus. In many parts gangrene has begun, and chiefly about the anterior portion of the lung. The pleura, the pericardium, and the diaphragm are black, thickened, and disposed to gangrene. Traces of inflammation are found in the abdomen, but not of so intense a character. The rumen is filled with dry food; the contents of the manyplus are so hardened that they may be broken and reduced to powder; the fourth stomach is more or less inflamed; the liver is enlarged, and of a yellow colour, and the bile is thickened.

It is evidently inflammation of the lungs, associated, more or less, with that typhoid form of disease to which cattle are so subject. Solitary cases of it are seen; but it often appears as a kind of epidemic. It used to be called *gangrenous* inflammation of the lungs, from the supposed gangrenous state in which the lungs were found; but veterinary surgeons are now aware that these appearances are produced more by congestion, and indicate the violence with which the blood has been driven through the vessels of the air-cells, and by which those vessels have been ruptured, and the cells filled with blood. The blood, once effused, soon coagulates in the cells, and gives that black, softened, pulpy kind of appearance which the cowleech and the herdsman used to think was proof positive of *rottenness*. It is true that this effused blood soon begins to be decomposed, and the fœtid smell of corruption ensues; but this is very different from gangrene of a living part. These congested lungs show that the inflammation was of the intensest character, and had not been long in destroying the animal.

Foreign writers give several accounts of this disease raging as an epizootic, and destroying a considerable proportion of the cattle. The history given by the poet Silius Italicus of an epidemic which raged in Sicily two hundred and twelve years before the Christian era paints the disease of modern times with almost perfect accuracy. It followed a long continued and excessive drought, which corrupted the water every where. In 1693 the principality of Hesse lost the greater part of its cattle by a malignant inflammation of the lungs. Here the winter had been wet and cold, and the spring which succeeded was as hot as summer. It was also said that an acrid and corrosive dew fell which tinged the linen with a yellow hue.

These writers imagined that the disease was not only epidemic, but contagious. They affirm that an epizootic pneumonia, which ravaged the department of Loiret, was brought into the environs of Montargis by some cattle that had been sold by the drovers; that it rapidly spread in all the villages in which the infected cattle had been purchased, and that its communication from place to place could easily be traced.

Professor Abildgaard, of Copenhagen, speaks of a species of pneumonia which he considers to be contagious, and which spread through the establishment of the King of Denmark. The contagious character of the disease, however, is far from being established. No other variety of pneumonia with which we are acquainted is contagious, at least under ordinary circumstances; yet the accounts that have been given of it are so contradictory, and veterinary science, as it regards cattle, is so truly in its infancy, that the farmer should take the most prudent course, and avoid, as much as he can, the possibility of contagion.

Few years pass in which this acute pneumonia does not visit some districts of the United Kingdom. The symptoms vary, but it is decidedly a disease of the respiratory system primarily, and the danger depends on the intensity of the inflammatory action in the early stage, and the degree in which the vital power being exhausted, disease of a typhoid and malignant character succeeds.

Of the nature of the treatment there can be no rational doubt. Although the state of acute fever is quickly succeeded by one of a perfectly contrary character, it is not until it has committed the most fearful ravages. The congested state of the lungs—the breaking down of the substance of that important part—must be sufficient to convince any rational person of the mischief that is going forward in the early stage, and the necessity of disarming the enemy before that mischief is irreparably inflicted. Therefore this acute pneumonia should be attacked in time, and by the most energetic treatment. Bleeding is the sheet-anchor, and should be pushed to its full extent. The important fact that the pulse, duly attended to, will prevent the possibility of injurious consequences from bleeding in every case cannot be too often alluded to. While the pulse keeps up, the power of the constitution, or rather the power of the disease, is unimpaired; and the faltering of pulse gives timely warning that one or the other is preparing to give way. It is folly to object that the after weakness will be increased, or that the bleeding will undermine the power of the constitution; it is the disease which is doing this, and which will perfectly and fatally accomplish its work if unchecked. By weakening the power of the disease, and especially if it could be beaten out of the field, the vigour of the system would be preserved, and the animal would be saved. In proportion to the intensity and rapid progress of the inflammation should be the vigour of the attack.

The state of the cough, and heat of the breath, and heaving of the flanks, will indicate, in the space of a few hours, whether the fever is permanently diminished, or has again rallied its forces; and by this the practitioner will be guided as to the propriety of a second bleeding, and the quantity of blood to be taken away.

Physic will of course succeed. Two scruples of the farina of the croton nut should first be given, as most likely to operate speedily; and the Epsom salts and the injection-pump should be in requisition until the bowels are well opened.

This being accomplished, the nature of the medicines next to be administered may well give the practitioner pause. If the inflammation evidently continues, the digitalis, emetic tartar, and nitre will be given. If the fever is, to a very considerable degree, subdued, but it is far from certain whether there may not be lurking danger of its return, the sedative medicines must still be given, but half an ounce of the spirit of nitrous ether should be added. This is an excellent medicine in such cases. It is both a sedative and a tonic. It allays irritation, and it stimulates to healthy action. Its good effect, however, is often destroyed by its being given in outrageous doses. In these doubtful cases it will rarely be prudent to give more than half an ounce; and when designed as a stimulant, the dose should rarely or never exceed double that quantity.

If the stage of debility is evidently and rapidly approaching, the chance of doing good is almost gone. What power will restore the former healthy state of the lung? Yet there is no cause for absolute despair. The mouth and nostrils and any suppurating tumours must be washed with the chloride of lime. A small quantity—half a drachm of the powder in solution—should be given internally, morning and night. The spirit of nitrous ether and laudanum, in doses not exceeding an ounce of the former with half an ounce of the latter, should be administered; and to them may be added ginger, gentian, and colombo, the whole being given in thick gruel, with half a pint of good ale.

Malt mashes, vetches, carrots, clover, hay—according to the season—may be offered as food, and, should the situation and time of the year permit it, the animal should be turned into a salt-marsh as soon as it has strength to travel there.

The epidemic nature of the malady not admitting of any doubt, and its contagious character being yet a question of dispute, while the healthy beasts are separated from the diseased, the owner cannot too often visit, nor too closely examine his cattle, in order to detect the earliest symptom of the disease, and to attack it while there is fair hope of success.

The sound animals, every one of them, should be bled and physicked. This inflammation is most intense in its character, and strong and healthy beasts in good condition fare the worst; then care should be taken to remove a plethoric state of the system, and thus to remove the predisposition to disease. They should likewise be turned, if possible, into a pasture good and containing sufficient nourishment, but not quite so luxuriant as that on which they had probably been placed.

PLEURISY.

While disease of the substance of the lungs usually takes on the form of bronchitis in cattle, these animals are nevertheless, and much oftener than the horse, subject to inflammation of the pleuræ, or covering membrane of the lung, and the lining one of the chest. Some—although perhaps, not quite satisfactory—reason may be assigned for this. The exemption of the ox from many of the exciting causes of pneumonia in the horse has already been hinted at, and to this may be added many of the exciting causes of pleurisy also. Among these, and the most frequent and active of them, is the exposure to partial cold. A horse may be hardly worked and ill used, but he generally has something which bears the semblance of a stable or a hovel to shelter him at night; but the ox, after hard work, and the cow, too soon after parturition, have nothing but the cold damp ground to lie upon. If the horse is thoughtlessly and cruelly abandoned in the same manner, yet the food passes out of his little stomach almost as fast as he gathers it, and he wanders about grazing during the greater part or the whole of the night; but the paunch of the ox is filled before a third part of the night has passed, and then comes the slower process of rumination, during which he usually lays himself down. What can afford so prolific a cause of pleurisy? If the horse can scarcely be ridden against a keen wind, or immersed, although but for a little while, as high as his chest in cold water, without exhibiting symptoms, more or less intense, of pleurisy, what will become of the ox, whose side, during the greater part of the night, is in contact with the frozen ground?

Even in his stable the ox is too much neglected. In many ill-managed farms his shed is little more than a repository for dung, which there undergoes its first fermentation. A little fresh litter is occasionally strewed over it; but underneath is a damp and poisonous mass, where the process of evaporation and the diffusion of pestilential gas are in great and almost equal activity. Supposing a beast to be couching on this fomes of disease during the greater part of the night—what can be more likely to cause inflammation of the lining membrane of the chest, separated from the muck-heap by so small a distance?

Pleurisy may be produced by contusions on the side, and by wounds penetrating the thoracic cavity: to these evils the ox, among his horned brethren, is far more exposed than the horse.

Whatever be the cause, post-mortem examination proves that, next to bronchitis, the most frequent disease of the chest is pleurisy.

Among the symptoms by which we may distinguish pleurisy from every other inflammatory affection of the chest, is the greater frequency of universal shivering, and particularly of shivering or trembling of the shoulders. This is a very peculiar symptom, and should be carefully studied. Even while the animal is otherwise quiet, the shoulders and upper part of the chest are trembling violently.

The cough of pleurisy is lower, shorter, and more painful than that of most other chest affections. The breathing, seldom so laborious as in some other cases, is shorter and broken off in the act of inspiration, and lengthened in that of expiration. The sides are tender; the animal shrinks if they are but lightly touched; and there are twitchings of the skin, and a very curious succession of wavy lines running over the affected side or sides.

The author recollects one case in which these symptoms of pleurisy were said to be absent—they certainly were absent when he saw the patient. It was a cow that, during nearly two months, had been wasting. The emaciation had proceeded to a most unusual degree; the skin clung to the very bones, the flanks were tucked up, and the hair was coming off. She ate and ruminated as usual, and the only disease that could be connected with this loss of flesh was obstinate constipation.

Plenty of purgative medicine was given, but she continued to waste away, and died. There was no disease of any of the viscera of the abdomen, and the only unusual appearance was the almost total absence of internal fat, the diminution, or almost disappearance, of the mesenteric glands, and a constricted state of the small intestines; but the chest was full of stinking puriform fluid, and there were adhesions in various directions. The real disease was pleurisy. The proprietor and the herdsman were very closely questioned with regard to previous cough and other symptoms of this disease; but they had not heard her hoose at all—they were sure that she had not.

She must have had cough and other characteristic symptoms of pleurisy, but to so slight a degree as not to attract the attention of those who look over their cattle so carelessly as both farmers and their servants generally do. It is, however, an instructive case, showing how much mischief may be going forward when it is least suspected, and of what imperative necessity an attention to the hoose of cattle is.

In bronchitis the animal dies of suffocation, or he is worn out by a continuance of inflammation on so extensive a membrane:—in pneumonia there is usually congestion of the lungs, so that the blood can no longer circulate, or there are tubercles or vomicæ, or the animal sinks here likewise under the continuance of the inflammation; but the termination of pleurisy is by the effusion of fluid into the chest, compressing the lungs on every side, gradually rendering respiration difficult, and at length impossible, and destroying the beast here likewise by suffocation.

There is little difference in the treatment of pneumonia and pleurisy. In both the inflammation must be subdued by bleeding, physic, sedatives, blisters, setons, and restricted diet. Half an ounce of the common liquid turpentine may be used with advantage, instead of the nitre, when the presence of pleurisy is clearly ascertained.

No advantage has been taken of an operation on the pleuritic ox by which the fluid might be withdrawn from the chest, as in the horse. It may be worth the attempt; yet, when the few cases in which the puncturing of the chest has succeeded in the horse are considered, there would not be room for any sanguine hope of success if it were practised on the ox.

Besides this, there are generally adhesions between the covering of the lung and the lining of the sides; and between the lung and the diaphragm, which would always interfere materially with the act of respiration and the health of the animal.

In all these cases of chest affection there is so little prospect of saving the beast, that it would be the interest of the owner to have him slaughtered at the beginning, if he is at all in condition, or rather if he is not deplorably thin.

CHRONIC PLEURISY.

There is so instructive an account of a chronic species of pleurisy, or of mingled pneumonia and pleurisy, in 'The Recueil de Médécine Vétérinaire,' for May, in the present year, (1833,) that the author is tempted to give it at considerable length. It is written by M. Lecoq, one of the teachers of the veterinary school of Lyons. There is considersble resemblance between it and the account which has been given of common pleurisy, but the reader will readily mark the difference, which is between an acute and a chronic disease.

He is speaking of Soire-le-Chateau, in the arrondissement of Avesnes, in which the farmers fatten more cattle than they breed, and therefore are obliged to purchase out of the neighbouring districts, and principally from Franche Comté. He says that 'the cattle of that country are very handsome, of a compact form, and fatten rapidly; and that they are the kind of cattle from which the grazier would derive most advantage, were it not for some diseases to which they are subject. The malady by which they are most frequently attacked, and which is particularly prevalent in some years, is one that is generally incurable, and the slaughter of the animal before he has perceptibly wasted, is the only means by which the farmer can avoid losing the whole value of the beast: this is *chronic pleura-pneumonia*—chronic pleurisy combined with pneumonia.

'The symptoms are scarcely recognisable at first, and often the beast is ill a long time without its being perceived. He fattens well, and when he is slaughtered the owner is astonished to find scarcely half of the lung capable of discharging the function of respiration. When, however, the ox has not sufficient strength of constitution to resist the ravages of disease, the first symptom that is observed is diminution, or irregularity of appetite. Soon afterwards a frequent and dry cough is heard, which becomes feeble and painful as the disease proceeds. The dorso-lumbar portion of the spine grows tender, the animal flinches when the part is pressed upon, and utters a peculiar groan or grunt which the graziers regard as a decisive symptom of the malady.

'Quickly after this the movements of the flanks become irregular and accelerated, and the act of respiration is accompanied by a kind of balancing motion of the whole body. The sides of the chest become as tender as the loins, or more so, for the animal immediately throws himself down, if pressed upon with any force. The elbows in many subjects become more and more separated from the sides of the chest. The pulse is smaller than natural, and not considerably increased. The muzzle is hot and dry alternately; the animal lies down as in a healthy state, but rumination is partially or entirely suspended. The fæces are harder than they should be; the urine is of its natural colour and quantity; the mouth is often dry, and the horns and the ears retain their natural temperature.

'This first stage of the disease sometimes continues during a month or more, and then, if the animal is to recover, or at least apparently so, the symptoms gradually disappear. First of all, the appetite returns, and the beast begins to acquire a little flesh. The proprietor should then make haste and get rid of him, for it is very rare that the malady, however it may be palliated for a while, does not re-appear with greater intensity than before.

'In most cases the disease continues to pursue its course towards its fatal termination without any remission—every symptom gradually increasing in intensity. The respiration becomes more painful; the head is more extended; the eyes are brilliant; every expiration is accompanied by a grunt, and by a kind of puckering of the angles of the lips; the cough becomes smaller, more suppressed, and yet more painful; the tongue protrudes from the mouth, and a frothy mucus is abundantly discharged; the breath becomes offensive; a purulent fluid of a bloody colour escapes from the nostrils; diarrhœa, profuse and fœtid, succeeds to the constipation; the animal becomes rapidly weaker; he is a complete skeleton, and at length he dies.

'Examination after death discovers slight traces of inflammation in the intestines, discoloration of the liver, and a hard and dry substance contained in the manyplus. The lungs adhere to the sides and to the diaphragm by numerous bands, evidently old and very firm. The substance of the lungs often presents a reddish-gray hepatisation throughout almost its whole extent. At other times, there are tubercles in every state of hardness, and in that of suppuration. The portion of the lung that is not hepatised is red, and gorged with blood. Beside the old adhesions, there are numerous ones of recent date. The pleura is not much reddened, but by its thickness in some points, its adhesions in others, and the effusion of a serous fluid, it proves how much and how long it has participated in the inflammatory action. The trachea and the bronchi are slightly red, and the right side of the heart is gorged with blood.'

M. Lecoq hazards some conjectures respecting the cause of this disease, which are very ingenious, and from which our breeders and graziers may derive some useful hints. He says that 'the graziers imagine that the animals bring the disease with them from their native country; and the traces of chronic disease which are found in them, even when they are slaughtered soon after their arrival, singularly confirm this opinion. Cattle that have been worked hard, and driven far, and somewhat too rapidly, are often attacked by diseases of the chest, which generally leave some dangerous traces behind them; and besides this, the breeders know their interest sufficiently well to get rid of those animals as soon as they can that have been affected with chest complaints.

'The manner in which the journey is performed contributes much to revive the old disorder. The cattle purchased in Franche Comté are brought into Avesnes at two periods of the year—in the autumn and in the spring. Those which are brought in the autumn are more subject to the disease than those which arrive in the spring; and almost always, the years in which the malady is most prevalent are those in which the weather was bad during the journey of the beasts; and the disease is usually fatal in proportion to the badness of the weather.

'The journey, also, is performed by two different routes—through Lorraine and Champagne, and often the disease appears only in the cattle that have arrived by one of these routes.

'The manner in which the cattle are treated on their arrival, may contribute not a little to the development of the disease. They have, perhaps, been driven a hundred leagues during bad weather; they have been half-starved on their journey, and they arrive famished and worn out, and, in fact, the greater part of them are lame. Calculating on their ravenous appetite, the graziers, instead of giving them wholesome food, make them consume the worst that the farm contains—all that is musty and mouldy; and it is often by the cough which the act of eating of such food necessarily produces, that the malady is first discovered.'

The treatment of chronic pleurisy is the most unsatisfactory part of this excellent memoir. He orders mild and nourishing food; for he argues that by increasing the debility of the animal, his death will be hastened. He recommends green meat, in order to soften the strangely-hardened contents of the manyplus, and mucilaginous drinks (made of oatmeal or linseed) for the same purpose. Whey is often given with the same view, and on account of the nutriment which it contains. Bleeding is rarely employed; or if the pulse should indicate venesection, very little blood is abstracted at a time, but the small bleedings are occasionally repeated. The principal dependence is placed on setons and rowels, which, if used at all, are carried to a great extent: but before these are resorted to, the proprietor is requested to determine whether he is disposed to persist in the medical treatment of the animal; for this mode of treatment having been once commenced, the swellings and discolourations produced by the setons and rowels will prevent the butcher from afterwards purchasing these animals. Injections, friction, and warmth are the auxiliary means employed.

However skilful may be the treatment, or however steadily pursued, it is rarely that a beast is saved; and that is not surprising, considering the numerous adhesions which were formed between the lungs and the sides of the chest before the animal began to exhibit any symptoms of illness. M. Lecoq adds, that it is good, although unpleasant, advice to give—it is what has been many a time inculcated in this treatise—that it is always preferable to send the diseased or suspected animal to the butcher before the process of emaciation is established in good earnest: a part of the original price of the beast is then recovered, and the expense of medical treatment, always long, and generally unsuccessful, is saved. M. Lecoq candidly confesses, that of thirty beasts of which he had the care, two only were apparently cured, and got into condition; and one of them died suddenly a few days after he was sold.

M. Lecoq finally enters into the question of the contagiousness of this disease. The farmers believe it to be contagious, and he is partly of their opinion. When a beast falls sick in the pasture, the others, after his removal, go and smell at the grass where he has lain, and which he has covered with his saliva; and after that, M. Lecoq has always seen new cases succeed to the first. He has also seen three cases in which the cattle of the country, perfectly well before, have fallen ill, and died with the same symptoms, except that they were more acute after they have been kept with pleuritic cattle. He, therefore, regards this affection as contagious; or at least, he imagines that, in the progress of the disease, the breath infects the air of a cowhouse in which there were other animals already predisposed to this, or similar, maladies. On the other hand, he acknowledges that many cases usually appear at the same time, and in cattle that have been widely separated from each other.

M. Lecoq has very clearly stated the chief causes of this disease, in addition to which it has clearly an epidemic character. There are certain states of the atmosphere which call into action these lurking predispositions to disease, found most in the stranger cattle, but sometimes in the natives (for bad management, and hoose, and pleurisy exist too much every where,) but there is not yet sufficient evidence of the contagious nature of all these affections of the respiratory organs. He, however, can never err who has recourse to the careful use of every precautionary measure.

PHTHISIS, OR CONSUMPTION.

This is only a continuation of the same subject, or, rather, it is a description of another termination of chronic disease of the lungs. One of the consequences of continued inflammation of the lungs is the formation of tubercles. There is a greater or smaller number of little distinct cysts, or cells into which some fluid is poured in the progress of inflammation.

These enlarge, and occupy a space varying from the size of a pin's head to that of a large egg. By degrees the fluid changes to a solid, and the tumour becomes harder than the surrounding substance, and so continues for awhile—the consequence of inflammation, and the source of new irritation and disease.

At length it once more changes. The tubercle begins to soften at its centre, something like suppuration goes on there, and the contents of the swellings become perfectly fluid, but of a different nature from that which first filled the cyst. It is now pus. The cyst increases with greater or less rapidity; it comes in contact with neighbouring ones, and the walls of each are absorbed by their mutual pressure. They run together and form one cyst, which is called an abscess, or vomica.

An animal possessing this tuberculated state of the lungs, and the tubercles running into abscesses, is said to be consumptive. So much of the lung is destroyed, that there is not enough left for the purposes of life, and the patient wastes away, and dies.

The lungs of the cow after chronic or neglected catarrh, or bronchitis, or pneumonia, or pleurisy, are much disposed to assume this tuberculated and ulcerated state. The symptoms of consumption are not always to be distinguished from those of pleurisy, or even pneumonia or bronchitis; and sometimes there may be extensive ulceration of the lungs without any indication of disease sufficient to attract notice. When a bullock is fattened for the butcher, and killed, we occasionally wonder to observe how little of the lung is left for the purpose of breathing.

A cough is the earliest symptom, but a cough of a peculiar character. It is too common to say carelessly, and sometimes cruelly, of a human being, 'that person has a churchyard cough.' The prediction is too often verified: for although it would be difficult to describe that cough, there is a character of its own about it which cannot be mistaken. It is so with regard to cattle. That veterinary surgeon is ignorant of his profession, who does not at once, and at a distance, recognise the cough which, although it may not precisely indicate phthisis, betrays a state of the lungs pregnant with danger. How many a beast might the farmer save if he would be attentive to this!

A bullock hooses:—if the cough is sonorous and clear, the lung is not yet fatally injured. That cough, however, must not be neglected long. It tells of inflammation—it is the product of inflammation—and of inflammation that may be silently, but rapidly, disorganizing the lungs. The prudent man will not suffer such a cough to continue many days, without giving a mash, or a dose of physic; or, perchance, bleeding, and inserting a seton. This is one of the points to which we cannot too often recur. It is new practice—it is new doctrine; but the interests of the agriculturist are peculiarly connected with it.

But, by and by, this cough becomes altered. It is no longer loud, and clear, and careless; it is lower in its tone—feeble—hoarse. Mischief has now been done, and perhaps of an irreparable kind. It must not, perhaps, be said that the farmer will always be able to point out the precise nature of the affection of the chest from the sound of the cough; but he will soon learn to do it much oftener, and much more certainly, than he has hitherto thought it possible. In simple catarrh there is an honest and unchecked effort of the lungs to force on the cough; yet some hoarseness may attend that cough, plainly referable to the superior air-passages. In bronchitis there will also be a forcible effort; the mucus is viscid; and the membrane of the tubes is thickened; and the passage is diminished; and considerable force must be used to urge on a volume of air, and to carry the mucus before it; but it is a force which acts slowly, and by pressure, for the membrane being inflamed is tender. The cough bespeaks pain; it is no longer full and perfect, it is slowly performed, and at the same time husky and wheezing, and the mucus rattles in the passage as it is forced along. In pneumonia the cough is frequent—sore; but it is not so sore as in bronchitis, for it has not the same inflamed membrane to pass over; it is, however, painful, for the substance of the lung is inflamed, and therefore it is low, and, to a certain degree, suppressed. In pleurisy the cough is sharper, spasmodic, yet not loud. Hitherto the pain has been confined to the lungs; here the lining membrane of the chest is affected, and intense pain is felt at every rising and falling of the chest; therefore the cough is short—it is *cut short*—it is somewhat spasmodic, and yet no louder than can be helped.

All this, it is confessed, is new doctrine, and may be considered as bordering too nearly on the regions of fancy by him who, never having attended to these things, knows nothing about them; but let him begin to attend to them, and the writer will venture to promise him that, although puzzled at first his progress in the art of distinguishing sounds will be most rapid; and he will at length begin to wonder that he could have lived so long among his cattle, and have been so deaf to that which is become too plain to be for a moment misunderstood.

The cough of incipient phthisis is an inward, feeble, painful, hoarse, rattling, gurgling one. The farmer will have reason to tremble when he recognises it, because it reveals fearful disorganization, which can seldom be repaired. He needs not, however, quite despair. The lungs of the cow have not been so sadly used as those of the horse. She is not hurried beyond her will or her strength at the caprice or cruelty of her owner. The progress of mischief is not unnecessarily accelerated, nor is the process of disorganization rapid. Weeks and months, or, under favourable circumstances, years, may pass on, and few other symptoms be added to this peculiar cough.

There is one duty, however, which the farmer owes to himself, and the practitioner to him by whom he is employed, and that is, to take a fair view of the whole of the case. Here is disorganization of the lungs—that cough which, once understood, can never deceive, has plainly revealed it. It is disorganization which may in a few cases, be repaired; but in the great, the decided majority of them, will proceed to its fatal termination. At the same time, it is a disorganization which does not immediately interfere with the discharge of the functions of life. The beast will fatten, and, perhaps, almost as rapidly as before. In some cases it has been imagined that by careful feeding, a very considerable degree of condition has been acquired with unusual quickness; but this will not, cannot last long. The effect of diseased structure, and diminished substance of the lungs, will soon tell in the unthriftiness and loss of condition of the beast. Except, therefore, peculiar value is attached to the animal, will it be prudent to attempt any medical treatment at all, or at least beyond that of a mere palliative nature?

If any thing is to be done, bleeding will be here, as in other inflammatory cases, the first step, but pursued in a more cautious manner than in any of the others—never pushed beyond the very first indication of its proper effect, nor repeated until after due consideration, and a full conviction that renewed irritation is beginning to be set up. To this must be added mild doses of physic, and the use of the sedative medicines; with proper care that the animal is not unnecessarily exposed to the vicissitudes of the weather, and yet avoiding too much nursing.

Another view may be taken of the case. Induced by some peculiar value which is placed on the breed, or by some circumstances which have, in the owner's estimation, a favourable appearance, or, somewhat too often, by the unjustifiable representations and promises of the practitioner, the medical treatment of a phthisicky beast is attempted in good earnest.

The attempt appears to be successful; the animal rallies, the cough diminishes, the flanks become quiet, the appetite returns, the milk is yielded more abundantly, the general condition of the beast seems to improve, and both owner and practitioner begin to fancy that danger has ceased. There is too much reason, however, for caution and fear.

There is one circumstance and one only, which will enable them to understand the real ground on which they stand, and that is, *the character of the cough*, which will still remain although much less frequent. Is it, again, the clear sonorous cough which indicates the comparative healthiness of the air-passages, or does it continue to be, to a greater or less degree, the painful, inward, feeble, gurgling cough? If it is the latter, the amendment is delusive. It is one of those strange, but temporary rallyings of nature, or transient effects of medicine, which are sometimes witnessed; or, perhaps there has been some salutary change of atmospheric influence: but there is mischief still—irretrievable mischief—and the most salutary advice that could be given to the owner would be, to dispose of the animal while something like its value can be obtained. Weeks, months may pass on; but by and by, from some slight cause—or from no cause that can be detected—the symptoms of confirmed phthisis appear, and the animal is lost.

This secondary, and more violent attack, has many symptoms similar to those that have been described as attending the later stages of bronchitis or pleurisy; but there are a few which would point out the nature and seat of the disease when there is no previous history of the case to guide the practitioner. The milk gradually diminishes, and, had it been examined before its diminution in quantity, an evident deterioration in quality would have been observed; it has acquired an unpleasant flavour —it quickly becomes sour—it spoils, or gives a peculiar taste to that with which it is mixed. The butter that is made from it is ill-flavoured, and the cheese will not acquire a proper consistence. Some have said that the milk is of a blue colour, and that it has more serum in its composition than ordinary and healthy milk.

There are few dairies in which there are not occasional differences in the quantity and quality of the produce. The disappointment and the loss of the dairyman have sometimes been considerable; and he has puzzled himself to no purpose to discover the cause; and has blamed the pasture or the servants, when his want of common observation has been the principal source of evil. Some of our readers may recollect these occurrences in their establishments; they may also recollect that a little while afterwards one, or two, or more, of their cows had bad hoose, and were losing condition, and they got rid of them as quickly as they could.

When consumption begins to be confirmed the animal loses flesh with greater or less rapidity, and becomes evidently weak. She eats with almost undiminished appetite; but the process of rumination requiring long, and now fatiguing action of the jaws, is slowly and lazily performed. There is frequently a discharge from the mouth or nostrils; or both; at first colourless and without smell, but soon becoming purulent, bloody, and fœtid. Diarrhœa is present, and that to a degree on which the most powerful astringents can make no impression. Then, also, appears the inflammation of the tissue beneath the skin. Whatever part of the animal is pressed upon, she shrinks; and if upon the loins, she moans with pain. The skin becomes dry and scaly; and it strangely creaks as the animal crawls staggering along.

One circumstance is very remarkable and characteristic. The mind and animal desires even of this comparatively dull and insensible being are roused to an extreme degree of intensity. The cow is, in many cases, almost continually at heat. When she is impregnated, the œstrum does not go off; and the consequence of this continuance of excitement is that she is very subject to abortion.

One of the causes of consumption, almost unsuspected by many breeders, and sufficiently guarded against only by a few—hereditary predisposition—cannot be spoken of in too peremptory terms. It is rare, indeed, that the offspring of a consumptive cow is not also consumptive. If it is a heifer-calf, she may possibly live a little after her first calving, and then she usually sickens, and the disease proceeds with a rapidity unknown in the mother. The author recollects two dairies that were almost destroyed by this hereditary taint.

Change of climate is a more frequent cause than many imagine. Some dairymen are aware how much depends on the cow being suited to the climate, or, rather, being in her native climate. This explains the strange difference of opinion with regard to breeds. Almost every farmer is partial to his own breed, and undervalues those of other districts, and even those of his neighbours; and to a very great degree he is right. His cattle breathe their native air; they are in a climate to which, by a slow and most beneficial process, and extending through many a generation back, their constitution has been in a manner moulded; and it is only after a long seasoning, and sometimes one attended by no little peril, that the stranger becomes at home in a foreign district; and so adapted and reconciled to the temperature, and degree of dryness or moisture, and to the difference of soil and herbage, as to do quite as well, and yield as much and as good milk, as in the vale in which she was reared. There is more in this than is often dreamed of in the farmer's philosophy.

Experience teaches that a change of climate involving a material difference in temperature or soil, or herbage, is frequently prejudicial; and that while there is derangement in every system, the respiratory one seems to suffer most, and a slow, insidious, yet fatal change is there oftenest effected. If a dairy of cows is removed from a moist situation to a dry and colder one, consumption will often appear among them, although a dry air is otherwise esteemed a specific against the complaint; but if they are taken from a dry situation, and put on a woody and damp one, phthisis is sure to appear before the first season is past.

Hurtrel D'Arboval states a curious fact relating to the Swiss cattle, and connected with this part of our subject. He says that the cows in Switzerland are not subject to consumption, although they pass the spring and summer on the mountains, unsheltered, breathing the coolest and purest air, and in the autumn and winter are shut up in close and hot stables, where not a breath of pure air can reach them, except when they are driven, as they daily are, far through the snow to water. They, however, who have no upland pasture to which their cattle can be removed, and whose beasts rarely go out of the miserable huts in which they are confined and fed, lose many an animal from phthisis. Habit, and a constitution gradually formed by the influence of these changes on many a generation, had prepared the first for them, or had rendered them in a manner necessary; but habit could not secure the others from the deleterious effect of empoisoned air and unwholesome or insufficient food.

There is one striking fact, showing the injurious effect of heated and empoisoned air on the pulmonary system. There are some cowhouses in which the heat is intense, and the inmates are often in a state of profuse perspiration. The doors and the windows must sometimes be opened, and then the wind blows in cold enough upon those that are close to them, and, one would naturally think, could not fail of being injurious. No such thing. These are the animals who escape; but the others at the farther end, on whom no wind blows, and where no perspiration is checked, are the first to have hoose, inflammation, and consumption. This fact speaks volumes with regard to the management in many a farm.

This is an unsatisfactory account of the nature and treatment of consumption; and, in now dismissing the diseases of the respiratory system, the author is far more disposed to direct the attentiou of his readers to the preventive than the medical treatment. By the former they may do much. Let the over-filled cow-houses be enlarged, and the close and hot ones better ventilated; let cruel neglect, and exposure, and starvation yield to more judicious and humane treatment; when cattle are fed on dry meat, let them have sufficient to drink two or three times every day; let those that exhibit decided symptoms of consumption be removed from the dairy, not because the disease is contagious, but because it is undeniably hereditary; and, in fine, where so little can be done in the way of cure, let nothing be omitted in the way of prevention.

CHAPTER XII.

THE STRUCTURE AND DISEASES OF THE GULLET AND STOMACHS.

THE ŒSOPHAGUS, OR GULLET.

The food having been forced along the posterior part of the mouth by the consecutive action of the tongue and the muscles of the pharynx, reaches the *œsophagus*, or *gullet*. This tube extends from the mouth to the stomachs, and conveys the food from the one to the other. In cattle this is true in a double sense; for not only does the food descend from the mouth to one of the stomachs, when it is first gathered, but is returned for a second mastication, and afterwards, a third time, traces the same path to its destination in the true digestive stomach. We may expect, and we shall find, some peculiarity of structure in the œsophagus, in order to prepare it for this increased duty.

We first observe the great thickness and strength of the gullet in the ox, compared with that of the horse. It is really worth while to compare the two together, and see how that of the ox is fitted for its treble work. The outer coat of loose cellular substance is the same in both—yielding and elastic. The second coat is a muscular one, and of great substance and power. Its increased substance enables it to dilate, when the large pellets of rapidly plucked grass, or pieces of parsnip or potato, or other hard roots, enter it; and the same increase of muscular substance enables it to contract more powerfully on such food, and pass it on to the stomach. There are two layers of muscles in the gullet of all our domesticated animals, and the fibres of the outer and inner layer run in different directions, and with plain and manifest reference to the natural food and habits of the animal.

The horse lives on grass or corn; or if, when he is stabled, roots are sometimes given to him, especial care is taken that they are so cut and sliced as to pass along the gullet without danger of forming any obstruction there. The form and symmetry of the animal require that the tube shall not be large or prominent, and yet, in his state of servitude, and his labours too often capriciously exerted, little time is allowed either for rest or food. The two layers in him are thus arranged:—the fibres of the outer layer are longitudinal, which, in their relaxed state, admit of the lengthening of the tube when the neck is extended and the head brought close to the ground in the act of grazing; and by their contraction they shorten the gullet in the act of swallowing. The fibres of the inner layer are circular, which although not adapted to extend much, in order to admit of the passage of large and hard bodies, are best calculated to contract on the kind of food which the horse swallows, and to force it down to the stomach with all the rapidity that is sometimes needed.

The fibres of both layers of the muscular coat in the ox are spiral, but they wind their way round the gullet in contrary directions, admitting thus of the lengthening and shortening of the tube in grazing and swallowing; offering, perhaps, not so much pressure on the food, and which the lazy mastication and rumination of the animal does not require; and permitting a great deal more dilatation when some large and hard substance finds its way into the gullet.

The inner coat, although a continuation of the membrane of the pharynx, is of a different character. It is more cuticular, smooth, and glistening. It lies in longitudinal plaits, so wide and numerous as sufficiently to dilate when the food passes, and to add very little to the obstacle when a portion of food unusually large is arrested in its passage.

The gullet pursues its course down the neck on the left of the windpipe, until it reaches the chest. It enters with the windpipe and blood-vessels through the opening between the two first ribs, and then winds its way along the upper part, until it reaches the diaphragm, which it pierces, and then soon terminates in a singular canal, which will presently be described.

OBSTRUCTION IN THE GULLET.

This is commonly called *choking*, whether it occurs in horses or cattle, and is far more fatal in the former than the latter, although not so frequent.* When a beast is first put on carrots, or parsnips, or potatoes, or

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* Although this treatise is devoted to Cattle, yet we cannot forbear quoting a paragraph or two relating to choking in the horse. The history of these curious cases, communicated to 'the Veterinarian' by Mr. King, of Stanmore, may put the owners of horses a little on their guard.

'I was some years ago, as I was accidentally passing, called in to the horse of a coach proprietor. The owner said that his horse had a bad sore throat, and could not swallow. He could not swallow; in fact, he did not even make an attempt, on severe compression. The history being, that he had worked and fed well the preceding day, and the œsophagus, as far as it could be examined, appearing without any obstruction, I did not suspect the real cause. He was blistered and drenched, but without any good effect, all the liquids returning without any efforts to swallow. On the third day after I first saw him he died. I much wished to ascertain the cause of the obstruction, and which proved to be a large ball of tobacco ashes, wrapped up in a double paper, and which rested in the œsophagus about half way between its entrance into the chest and the stomach. All knowledge of its having been given was stoutly denied, but it was afterwards confessed that the nostrum was exhibited as a supposed cure for worms.

'A cause of choking and which has killed many horses, likewise exists in a notion that new-laid eggs will improve condition. I believe the practice is, previously to giving the egg, to star the shell in a few places; and when the shell has not been sufficiently weakened to yield to the pressure of the parts, the mischief ensues. I was once called to a very violent horse with supposed sore throat. He had taken nothing for two days. The turnips he is very apt to be choked. The first mastication is always a very careless affair, and every thing that is put before the animal is swallowed with very little chewing. If the herdsman has not been attentive in slicing or bruising the roots, mischief this of kind is likely to happen. It happens oftener than the cow-herd or the owner is willing to confess, when eggs, either to promote condition in cattle, are given whole, or loaded with tar, or some nauseous drug, in cases of blain, hoose, mawsick, or other supposed stomach complaints.

When the root sticks in the gullet, and can be evidenly seen and felt there, the farmer or the cowherd first gets his cartwhip—in good hands, not a dangerous instrument, on account of its being pliable and yielding; others take a cart-rope, which is somewhat more objectionable, because the ends may do mischief. They who have neither good sense, nor regard for the sufferings they may inflict, take even a common rack-stave. Whatever it be, they thrust it down the gullet and work away might and main, to drive the offending body down.

There is no doubt that some instrument should be introduced into the gullet in order to push the root into the stomach, but it is the force that is used to which we object, and that does all the mischief. A case or two will illustrate this. The first occurred in the practice of Mr. King. A cow was choked with a turnip; the rack-stave was had recourse too, and the owner was sure that ‘he had passed the turnip, for the cow had swallowed a drink that had been given.’ Still she was not doing well; there was no rumination, and she would neither eat nor drink. Mr. King was sent for. He found his patient low and feverish, and she heaved considerably; she swallowed every thing that was poured down the throat; there was no swelling of the neck; no tumour could be felt externally, and the probang went its full length into the stomach. The practitioner gave the proper medicines in such a case, but on the third day the beast died. On examining her it was found that the rack-stave had been used with so much force as to make a considerable rent in the œsophagus, through which the turnip escaped, and lay in the surrounding cellular membrane.

The second case occurred to the writer of this treatise. A market gardener, on rooting up his parsnips, ordered them to be cut into small pieces and given to his cattle. The hind gave them whole, and the beasts greedily devoured them. A large piece stuck in the gullet of a valuable cow, and was evidently seen and felt about half way down the neck, and the poor animal began to swell enormously, and panted sadly. The cow-leech was sent for, who using first, the butt-end of a cart-whip, and afterwards a long and stout osier-rod, forced it into the chest, and then had no more power over it with either of his rude instruments. The author was now sent for. On applying a probang, he found the obstruction about three inches within the thorax, and he soon ascertained that it was firmly impacted there. The application of force in the common way was out of all question; he, therefore withdrew the slider which guarded the protrusion of the stilett, and endeavoured to move the obstruction forward by slight but repeated percussions, and was convinced that he was gaining ground, although very slowly. He persisted, and after the expiration of about twenty minutes the parsnip gave way, and the probang entered the stomach.

attendant swore *he* could not account for it; but as the animal had every general indication of health, I gave little credit to his statement. Having properly secured the horse; I passed the probang down the throat, in doing which I experienced some resistance. On its return to the mouth the bulb was literally covered with fragments of egg-shell. The horse was soon well; but I doubt, if this egg had not been weakened, whether the quiet introduction of the instrument would have broken it down in that situation.' —*Veterinarian, January*, 1833.

A vast quantity of gas, mixed with fluid of a very fœtid character and small portions of food, was violently discharged. The enlargement of the belly subsided, and the animal experienced sudden, and, as it was thought, perfect relief. By way of making every thing sure, she was bled, and a dose of physic was given to her; but in eight-and-forty hours she was dead. The whole of the gullet, from about eight inches below its commencement to within the same distance from the stomach, presented a mass of laceration and inflammation which had destroyed her.

DESCRIPTION OF THE ŒSOPHAGUS PROBANG.

Every farmer should have a flexible probang ready for use, either of the improved kind, as contrived by Mr. Read, or on the plan of that which was first introduced by Dr. Monro.

This cut will give a sufficient idea of the construction of the most useful probang, or œsophagus-tube:—

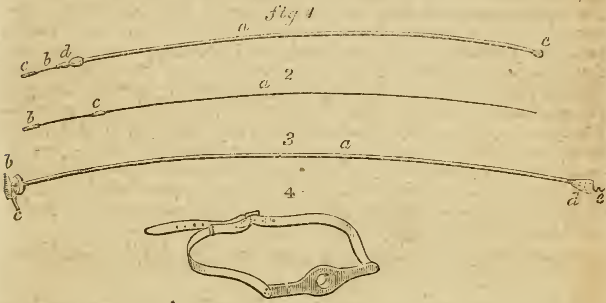


Fig. 1. *a.* The tube, made either of simple leather, or of leather covering a canal formed of spiral wire. It is about four feet and a half in length, so as to reach from the mouth to the rumen, and leaving a sufficient portion outside the mouth for it to be firmly grasped.

b. The stilett, represented as introduced into the tube, and running the whole length of it. It gives greater firmness and strength to the tube, when it is either passed into the stomach in cases of hoove, or used to force any thing down the gullet.

c. The handle of the stilett.

d. A hollow piece of wood running freely upon the stilett, and placed between the handle of the stilett and the round extremity of the tube. The stilett is longer than the tube by the extent of this piece of wood, but is prevented from protruding beyond the bulb of the tube at the other end by the interposition of this slider at the handle. The stilett may be introduced at either end of the tube. It is usually inserted at *e* when the instrument is used to force any obstructing body down the throat, because the enlarged and bulbous termination of the tube at the other end has a flat or rather concave surface, and can therefore act with more effect and power on the substance which sticks in the throat.

e. The end of the tube which is introduced into the paunch in cases of hoove. Its rounded extremity will permit it to be more easily forced through the roof of the paunch, and it is perforated with holes for the escape of the gas with which the paunch may be distended.

Fig. 2 represents the whalebone stilett, with the hollow piece of wood running upon it, and shows how easily it may be withdrawn from the stilett when that is taken out of the tube. The running piece of wood being withdrawn, if the handle of the stilett is then pushed down on the bulb of the tube, a portion of it will project at the other end: and by moving the stilett up and down in the tube, this may be made to act on the obstructing body in the manner and with somewhat of the force of a hammer.

Fig. 3 will be presently described.

Fig. 4 is a piece of thick strong wood, widest at the centre, and there perforated. It is introduced into the mouth in order to keep it open during the use of the probang, which is inserted through the hole in the centre. Leathern straps are nailed to the extremities: these are buckled round the horns, and by means of them this mouth-piece is securely fastened; while one of the extremities, being grasped by the operator, forms a very useful point of support during the use of the tube. The farmer should also have another *mouth-piece*, with a central hole that will admit of the passage of a small hand. He will thus be enabled to get at and to remove substances that have not descended beyond the commencement of the gullet, or that have been returned so far by means to be hereafter described. This mouth-piece will be very useful in cases of polypus in the nose and many diseases of the pharynx; but it would be too large to be long continued in the mouth without great pain to the animal, nor could the probang be so securely or effectually worked through so extensive an aperture. It is high time that those rude, and dangerous, and ineffectual instruments—the cart-whip, and the cart-rope, and the rack-stave—should be banished from the practice of the veterinary surgeon, and discarded by the farmer too.

MODE OF OPERATING FOR THE REMOVAL OF SUBSTANCES OBSTRUCTING THE GULLET.

Let it be supposed that a cow has swallowed a potato, or turnip, too large to descend the gullet, and which is arrested in its progress, and evidently seen at a certain distance down the throat. The farmer should have immediate recourse to the œsophagus-tube, introducing the flatter end into the throat, and using moderate force. If the obstructing body yields to this, he will be justified in pushing it on within the chest; but if, with the application of a fair degree of force, it is very slowly, and with difficulty pushed on, the operator should instantly relinquish the determination to drive it down, for the fibres of the muscular coat of the gullet soon become irritated by the continued distention, and contract powerfully, and, as it were, spasmodically, upon the foreign body, and imprison it there. It should also be remembered that the gullet itself becomes smaller as soon as it has entered the thorax; and, consequently, that which could not be moved without difficulty in the upper part of the neck, will not be moved at all in the lower portion of it.

The next consideration then is, whether, although the obstructing body cannot be driven on, it may not be solicited, or forced backwards. The fibres of the upper part of the gullet have already yielded, and suffered this substance to pass them—they are somewhat weakened by the unnatural distention—they have not yet had time to recover their tone, and they may yield again. It is at least worth the trial.

The internal coat of the œsophagus is naturally smooth and glistening; it may, however, be made more so, and the surface of the obstructing body may be polished too. A half-pint of olive oil should be poured down the throat, and an attempt then made with the fingers, applied externally, to give the body a retrograde motion. By patient manipulation this will be effected much oftener than is imagined. The intruding substance will be dislodged from the situation in which it was impacted, and will be brought to the upper part of the œsophagus, or even into the pharynx, and will then be sometimes got rid of by the efforts of the beast itself, or may be easily drawn out by means of a hand introduced through the large mouth-piece to which reference was made in the explanation of the œsophagus-tube.

If the obstructing body cannot be moved in this way, we are not yet without resource. Mr. Read has made an important improvement on, or addition to, the œsophagus-tube, in the form of a corkscrew. Vide fig. 3, in the preceding cut.

a. The leather tube, as before, but somewhat larger, and longer, and stronger; and the upper part of it, for the purpose of additional strength, composed of brass.

b. The handle of the stilett which runs through it, as through the other tube.

c. One of two pieces of wood placed between the handle and the tube; hollowed so as to fit the stilett; removable in a moment, and, like the hollow piece of wood in the other tube, permitting the stilett to be two or three inches longer than the tube. They are here removed, and one of them hangs down, suspended by a string.

d. The bulb which is introduced through the mouth-piece, and forced down the gullet. It is considerably larger than those at the ends of the other tube, but not so large as the distended gullet.

e. A corkscrew fixed to the end of the stilett, and which, coming out in the centre of the knob, cannot possibly wound the gullet.

When this instrument is used, the stilett is pulled up so that the screw is perfectly retracted and concealed within the knob. The pieces of wood, *c*, are placed upon the stilett, between the handle and the top of the tube, and tied there, so that the screw is now fixed within the knob; and the instrument is introduced through the mouth-piece, and forced down the throat until it reaches the obstruction. The pieces of wood are then untied, and, by turning the handle, the screw is worked into the obstructing body, as the common corkscrew is into a cork in the neck of a bottle. If the potato or turnip is fresh and sound, it would hardly be credited what purchase is obtained, and in how many instances the nuisance may be drawn up the throat and got rid of. If the centre of the root should give way, and a portion of it only be brought out, there is still some good done, and the screw should be returned again and again, until it will no longer take hold. By this time, probably, the root will have been so weakened and broken down that it will yield to the pressure of the first probang, and be forced along into the rumen; or at least it will be so weakened, that the stilett of the first tube may be used with advantage.

The stilett must be withdrawn from the tube, and the running piece of wood taken away; the stilett is then returned to its sheath, and may be made to project a couple of inches beyond the knob. It is retracted, and the tube is passed into the throat; when it will be evident that the operator may use either the comparatively broad part of the knob, or the small and sharp stilett, as the case may seem to require. To the first he can only apply simple pressure—to the stilett he can give a percussive action. By sharply pushing down the handle of the stilett, he will make the other end act with the power of a little hammer, and thus more break down, and probably work through, the centre of the root, as in the case which has been just related. A perforation having been made through the centre, and the obstruction having been previously torn and weakened by the screw, the whole may gradually be broken down, or will more readily yield to pressure.

These directions have been founded on the supposition that the foreign body is lodged in the gullet above the entrance into the thorax; and if the operator fails in all these contrivances, perhaps he will now admit, although reluctantly, the application of external force. It has been recommended to place a small piece of wood against the gullet, and in contact with that portion of the skin which covers the obstructing body, and then, with a wooden mallet, to hammer away against the opposite side. The root has been thus occasionally broken down, and then forced on with the cart-whip; but more frequently the beast has been sadly punished without any good effect having been produced; and, in some instances, although the nuisance was for a while got rid of, so much tenderness of the gullet remained, and inflammation arose, and ran to such an extent, that the animal did not regain its appetite for many weeks afterwards, or pined away, and became comparatively worthless. The practitioner will, therefore, unwillingly have recourse to this, and will be justified in first seeing what bleeding will do. There is not a more powerful relaxant than bleeding—and especially when it is carried on, if necessary, to absolute fainting. For awhile every spasmodic action ceases, and every muscular fibre loses its power to contract. The operator will, probably, take advantage of the momentary relaxation, in order to force the body either upwards or downwards—upwards first, and by far in preference; or if downwards, yet still cautiously balancing in his mind the degree of resistance with the chance of ultimate success; for, if the resistance continues to be considerable, he may depend upon it that when he has arrived at the thorax, all further efforts will be fruitless, and the patient will be lost.

He has one last resource, and he needs not to be so afraid of venturing upon it as some practitioners have been. There is the operation of *œsophagotomy*, or the cutting down upon the obstruction, and thus removing it. The veterinary surgeon will never find, or ought never to find, difficulty here, although the human surgeon is deemed bold who ventures upon the operation.

After having passed a little way down the neck, the œsophagus is found on the left of the trachea, and between the carotid and the jugular. The artery will be detected by its pulsation, and the vein by its turgescence. The only muscle that can be in danger is the sterno-maxillaris, and that may, in a very great majority of cases, be avoided, or, if it is wounded, no great mischief will ensue.

The animal should be cast, (at least this is the safest way, as it regards both the operator and the patient.) It should be thrown on the right side, and the head should be a little stretched out, but lying as flat as the horns will permit. The place of obstruction will be seen at once. An incision is by some persons made immediately into the gullet, sufficiently long for the extraction of the root. The safer way, however, is for the cellular substance to be a little dissected away before the gullet is opened, when, if the incision is long enough, the incarcerated body will readily escape. The edges of the œsophagus should then be brought together, and confined by two or three stitches; the skin should also have the same number passed through it, the ends of the stitches of the gullet having been brought through the external wound. The beast should have nothing but gruel for two or three days; and, after that, gruel and mashes for a little while longer. In a fortnight or three weeks the wound will generally be healed, and scarcely a trace of the incision will be visible.

If the obstruction is not observed, or the practitioner not called in until the potato or parsnip has passed into that portion of the gullet which is within the thorax, the chances of saving the animal are materially diminished. The common probang should first be tried, and, that failing, the corkscrew should be resorted to, either to draw the body out, or so to pierce it and break it down, that it may be forced onward either by the stilett or the knob. The practitioner must stand at a little ceremony here, and he should, if necessary, use all the force he can; for, if the obstruction is not overcome the animal will assuredly perish.

It has often been observed, and with much truth, that cows, in whose gullet this obstruction has once taken place, are subject to it afterwards. Either they had a habit of voracious feeding, or the muscles are weakened by this spasmodic action, and not able to contract upon the food with sufficient force for the ordinary purposes of deglutition. It will therefore generally be prudent to part with the cow that has once suffered from an accident of this kind.

STRICTURE OF THE ŒSOPHAGUS.

This rarely occurs either in horses or cattle. It is, however, a little more frequent in the latter than in the former. The writer of this treatise has met with only one marked case of it. The cow had been observed to be a slow feeder: she was grazing when the others were ruminating; and she was ruminating long after they had been busily employed in grazing. At length the owner, being more attentive than the proprietors of cattle generally are, observed that the food occasionally accumulated in the upper part of the gullet until there was a swelling eight or ten inches in length, terminating in an evident contraction of the œsophagus. She was then in rather low condition, and was gradually losing flesh. Sometimes, with an effort, she could force the contents of the gullet along their proper course; then, two or three days or a week would elapse before any thing would again accumulate there; and, at all times, the proprietor could easily press down the food which was thus interrupted in its passage. It was an evident stricture of the œsophagus; and so far as could be learned, the diameter of the gullet had been gradually lessening at this point.

The practitioner recommended that she should be destroyed: alleging that a cure was improbable, and must, at the best, occupy a long period of time, and be expensive. She was young in calf, and that by a valuable bull, and he was desired to do what he could. He passed a probang through the stricture, as large as, without too great violence, he could manage, and confined it there for an hour by means of tapes. The cow was violent, but still this was accomplished for a few days, when a larger probang was used, but at length she became perfectly unmanageable. She was then cast, and the introduction of the probang attempted; but there was an awkwardness about it, and her violence threatened injury to herself and those about her. Some ground, however, had been gained, and with that the owner, tired of the trouble, and afraid of the expense, expressed himself contented. The food accumulated less frequently, and, soon after her calving ceased to accumulate at all.

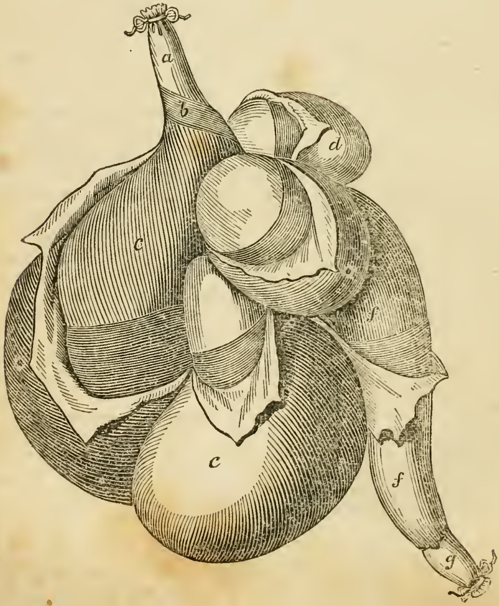
RUPTURE OF THE ŒSOPHAGUS.

In cases of laceration, or rupture of the gullet, which too frequently follow the violent attempts of unskilful persons to force down the obstructing body, something might be done if the mischief was immediately ascertained. Prudence, however, would dictate the sacrifice of the animal, while it could be fairly sold to the butcher.

If the cure is undertaken, the part must be opened—the foreign body liberated from the cellular texture into which it had probably been driven—all the dirt and indigested matter cleared carefully away—the ragged and lacerated edges cut off—the divided portions brought as neatly and as closely together as possible—and the whole secured by bandages passed several times round the neck; while the animal is allowed gruel only for many a day, and then mashes. The dressing should be the healing ointment, daily applied. The power of nature is great; and, the foreign body having been removed before it could cause inflammation and mortification by its presence, the parts may be reinstated to every useful purpose.

THE ŒSOPHAGUS WITHIN THE THORAX.

As the œsophagus approaches the chest it takes a direction more and more towards the left, and enters it on that side of the windpipe. It is there found between the laminæ of the mediastinum, following the direction of the dorsal vertebræ. It passes, as in the horse, by the base of the heart, leaving the venæ cavæ on the right, and the aorta on the left. It by degrees separates itself from the spine, but not so much as in the horse, penetrating between the lungs, and, pursuing its course towards the diaphragm, passes through the great opening between the crura of



that muscle. As it travels through the mediastinum and between the lungs, it diminishes in size, and acquires considerable firmness of texture; but it has no sooner entered the abdomen, and begun to dip downwards, than it becomes more muscular, and less firm in its structure. It also rapidly increases in size until it assumes almost the shape of a funnel; and terminates directly in no particular stomach, but in a canal which opens into all the stomachs, of which, as will be seen, the ruminant possesses four.

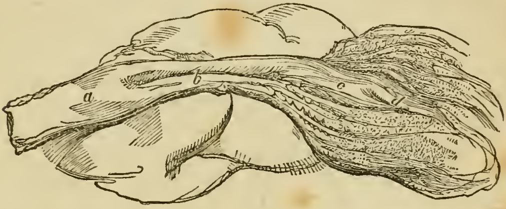
Recourse must be had to a few cuts in order to render this intelligible to the reader.

The cut in the preceding page will exhibit the form of the stomachs when filled, their relative situations, and their connexion with each other.

a. The œsophagus gradually enlarging as it descends, and apparently running into the rumen or paunch, but, in fact, terminating in a canal.

b. A continuation of the spiral muscles of the œsophagus, thicker and more powerful as they approach the termination of that tube.

Before the reader proceeds to the consideration of the other parts delineated in that cut, it may be advantageous to take a different view of the structure and termination of the gullet.



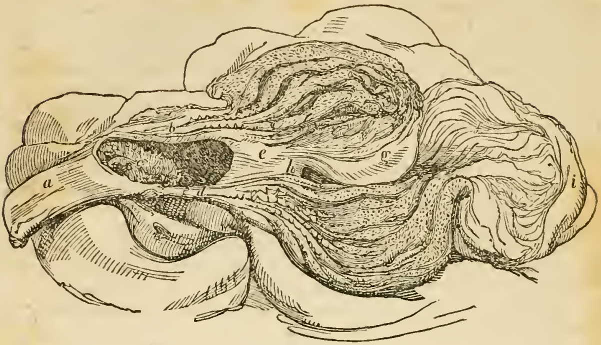
a. The œsophagus enlarging as it descends, and becoming more muscular, and particularly the upper and posterior part of it. The continuation of it along the stomachs is slit up, in order to show that it would form the continuous roof of the canal which is here laid open, and which leads to the third and fourth stomachs.

b. The *œsophagean canal* exposed by slitting the roof from the termination of the gullet to the third stomach. A considerable part of the floor is composed of two muscular pillars, lying close to each other. It would therefore appear, at first inspection, to be a perfect canal, and that what descended into it from the gullet would run on to the third and fourth stomachs. These pillars are duplicatures of the roof of the first and second stomachs, which lie immediately underneath them.

c is the continuation of the same canal into and through the manyplus, or third stomach, which is known by its leaves and thin hooked edges.

d is a prolongation of the same canal into the fourth, or true digestive stomach. It is easy therefore to perceive that the food, whether solid or fluid, may, at the will of the animal, or under particular circumstances of the constitution, pass into the third and fourth stomachs, without a particle of it entering into the first or second; and we know that this is the case with the food after it has undergone the process of rumination, or a second mastication.

The following cut will give another view of the same parts.



a is again the œsophagus, terminating in the œsophagean canal.

b is, as before, the œsophagean canal; but now, at the will of the animal, or under certain states of the constitution, these pillars are no longer in contact with each other, but there is a large opening at the bottom of the œsophagus displaying the two first stomachs lying under them.

c is the *rumen*, or *paunch*, or first stomach, placed immediately under the termination of the gullet, and substances descending that tube fall through this opening, and are received into it. All the food when first swallowed, goes there to be preserved for the act of rumination; and a portion, and occasionally the greatest portion, of the fluids that pass down the gullet, enter the rumen. Farther on, at

d, is the *reticulum*, or second stomach. From the state of that stomach, or at the will of the animal, the muscular pillars here also relax, seldom or never to permit that which is passing along the œsophagean canal to enter the reticulum, but that the contents of the reticulum may be thrown into the œsophagean canal. This is the case when the pellet of food is returned for remastication—it is thrown into the canal from the reticulum—it is seized by the powerful muscles at the base of the gullet, and carried up by the spiral muscles of that tube in order to be remasticated. It will be seen the upper pillar (situated towards the right in the living subject,) and the lower part of the opening made by the relaxation of the pillars, belong to the reticulum; the lower pillar and the anterior portion of the opening (situated towards the left) belong to the roof of the rumen. This is very satisfactorily seen in the dried stomach of a young calf.

e is the manyplus, or third stomach, and through which the canal is still to be traced to

b, the abomasum, or fourth, or true digesting stomach. So that, as was asserted, this canal leads to no particular stomach exclusively, but to all of them, according to circumstances.

We are now, perhaps, prepared to return to the consideration of the first cut (p. 422.)

c c represent the form of this stomach in the greater part of ruminants, and particularly in oxen and sheep. It is situated somewhat obliquely in the abdominal cavity, and occupies nearly three-fourths of it. It is divided into two unequal compartments, or sacs, and reaches from the diaphragm to the pelvic cavity. By its superior surface it is attached to the sublumbar region by its vessels, nerves, and a portion of mesentery. On the right side it is covered by a portion of the intestines; on the left side it is more elevated, and is in contact with the left flank. It is on this account that we are sometimes induced to adopt the unsurgical mode of giving relief in cases of hoove; for when we plunge our lancet or knife into the left flank, we puncture the distended stomach. Its inferior surface rests upon the floor of the belly. The left side reaches to the diaphragm, and thence, under the left flank, to the pelvis. The right side rests on the floor of the abdomen, and is covered by the fourth stomach. The anterior extremity is attached to the diaphragm by the œsophagus, and by the cardiac ligament; and the right extremity floats free, generally occupying the pelvis, but pushed thence in the latter period of gestation.

Deep scissures not only divide it into two lobes, as has been mentioned, but another scissure posteriorly, which will be shown in the next cut, forms it into two others; so that its interior presents four compartments, separated from each by deeply projecting duplicatures of the walls of the stomach.

This cut represents two of the three coats of the rumen.

The external, or *peritoneal*, coat is here represented as turned back at different places in order to show the muscular coat, which, as in the horse, consists of two layers, the one running longitudinally and the other transversely; yet not accurately so, for they appear to run obliquely, and in many different directions, according to the varying curvatures of the stomach. A very erroneous opinion of this great macerating stomach would be formed by considering it as a mere passive reservoir in which the food is contained until it is wanted for rumination: it is in constant motion; the food is perpetually revolving through its different compartments, and undergoing important preparation for future digestion. These muscles are the mechanical agents by which this is effected, and by running in these different directions they are enabled to act upon all the differently-formed cells of this enormous viscus.

d. The *reticulum*, or *honey-comb*, or second stomach, viewed externally, and supposed to be filled. It is a little curved upon itself from below upwards, and is the smallest of all the stomachs. It rests against the diaphragm in front of the left sac of the rumen, and is placed under the œsophagus, and upon the abdominal prolongation of the sternum. There are two layers of muscles belonging to this stomach, one of them running longitudinally and the other transversely, as in the rumen.

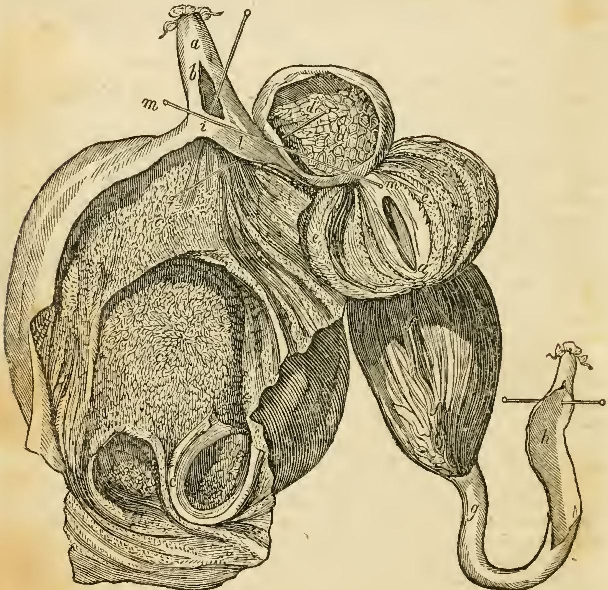
e gives the external appearance of the *manyplus*, or third stomach. It is less rounded, and longer than the reticulum. It is curved upon itself from above downwards. Its little curvature is applied on the left, partly over the reticulum, and more on the paunch; and on the right, it is placed over the base of the fourth stomach. It is situated obliquely from the right side of the abdomen, between the liver and the right sac of the rumen. Girard thus describes it:—"Its anterior face rests against the liver and the diaphragm—its posterior is placed over the right sac of the rumen. Its great, rounded, convex curvature is attached to the fourth stomach, and also to the rumen, by a prolongation of mesentery; and its little curvature is continuous with that of the reticulum."

Fig. 1 and 2 represent the two layers of muscles as before.

f. The *abomasum*, or fourth stomach, is described by Girard as "elongated, and of a cone-like form, yet somewhat bent into an arch, situated obliquely to the right of and behind the manyplus, and between the diaphragm and the right sac of the rumen." It has two free or unattached faces, one against the diaphragm and the other against the right sac of the rumen—two curvatures, the inferior and larger convex, and giving attachment along its inner border to a portion of mesentery, which extends to the inferior scissures of the rumen; and the superior or smaller receiving the portions of mesentery which go from the reticulum to the superior scissures of the rumen. It is also said to have two extremities, the one anterior, which is the largest and placed inferiorly, adhering to the smaller curvature of the manyplus, and constituting the base, or great extremity of the abomasum—and the posterior and superior, which is narrow, elongated, curved above and backwards on the superior face of the right sac of the rumen, and called the smaller or pyloric extremity.

A dissection of the muscular coat is given here as in the other stomachs. *g* represents the commencement of the *duodenum*, or first intestine.

The reader is now prepared for the consideration of the interior of these stomachs.



a. The *œsophagus*, as before, enlarging, and assuming a funnel-like shape as it approaches the stomachs.

b. The *œsophagus* cut open at the commencement of the *œsophagean canal*, in order to show its communication with the first and second stomachs.

c. The rumen laid open and divided into its different compartments by scissures, more or less deep, and which on the internal surface appear as indentations, or duplicatures of the coats of the stomach. They are recognized under the name of the double-tripe when prepared for the table. The rumen is divided into two large sacs, seen in the cut of the external form of the stomachs (p. 422,) and the walls that separate them are thick, and perpendicular to the surface of the stomach, so as to form a very considerable separation between the compartments of the stomach. These again are subdivided by transversal bands, which form smaller compartments. Two, belonging to the posterior portion of the stomach, are given in this cut. There are similar divisions in the anterior sac, but which are here concealed by one of the folds of the stomach.

The whole of the rumen is covered by a cuticular membrane, constituting the third or inner coat. Immediately under this, and arising from the interposed tissue between the muscular and cuticular coats, there are innumerable small prominences or papillæ. They are of different sizes and forms in different parts of the rumen. Towards the longitudinal bands or duplicatures they are small, and thinly set; they are more numerous and larger towards the centre of the compartments; and largest of all in the bottom of the posterior and most capacious sac. In every part of the rumen they are more thickly set, and broad and strong towards the centre or bottom of each compartment. They are also harder and blacker in these places. When regarded in different compartments, they appear to be bent or inclined in different directions; but when they are more closely examined, they are all inclined in the direction which the food takes in its passage through the various divisions of the rumen. They are evidently erectile, and may sometimes bristle up and oppose the passage of the food; while, at other times they yield and bend, and suffer it to pass with little or no obstruction. Some have imagined that these are glandular bodies, and that they secrete a peculiar fluid; others confine the glandular apparatus to the tissue between the cuticular coat, and numerous little prominences, which can be seen in the inflated stomach of a young ruminant when exposed to the light, are best accounted for by considering them as glandular bodies.

There are two openings into the rumen; the one already spoken of at the base of the œsophagus, and through which the substances gathered at the first cropping of the food, and perhaps all solids fall, and a considerable proportion of the liquids swallowed. The other opening is below this. It is larger and always open; it communicates with the second stomach; but there is a semilunar fold of the rumen that runs obliquely across it, and acts as a valve, so that nothing can pass from the first into the second stomach, except by some forcible effort; and it is very seldom that any thing is returned from the rumen directly into the œsophagus.

Considering the size of the paunch, it has very few blood-vessels; in fact, it has not much to do except macerating the food. The arteries are supplied by the splenics, which are of very great size in ruminants. The nerves are given out by the cœliac plexus.

d. The *reticulum*, or second stomach. The cuticular coat here covers a very irregular surface; consisting of cells, shallower and wider than those of a honey-comb, but very much resembling them; hence this stomach is sometimes called the *honey-comb*. Each of these divisions contains several smaller ones; and at the base and along the sides of each are found numerous minute prominences, or papillæ; which are evidently secreting glands.

There are two openings into the stomach; one through the floor of the œsophagean canal, one of the pillars of which is formed of a duplicature of the coats of the lesser curvature of the reticulum. The other is that already described, between this stomach and the rumen.

The muscular coat of this stomach is thick and powerful, but the blood-vessels are not numerous, for it will hereafter appear that its functions are very simple. The arteries and nerves of the reticulum are derived from the same source as those of the rumen.

e. The *manyplus*, or third stomach. The internal structure of this stomach is very singular. The œsophagean canal changes its form and character at the commencement of the manyplus, and the fleshy pillars of which mention has been so often made, unite, forming a kind of obtuse angle. The floor of the canal is now perfect, and nothing can any longer fall into the stomachs beneath. A small circular aperture alone is left between them, which conducts to the third stomach, the floor of which is closed, but the roof is constructed in a remarkable way. The whole of the stomach contributes to form this roof; and from it there descend numerous duplicatures of the cuticular coat, each duplicature containing within it cellular tissue, blood-vessels, and a thin but powerful layer of muscles. They are formed into groups. A long duplicature, resembling a leaf or curtain, hangs from the roof, and floats free in the stomach, and reaches nearly down to the floor. On either side of it is a shorter leaf, and beyond that a shorter still, until the outer leaf becomes very narrow. Then commences another group with a long leaf in the centre, and others progressively shortening on each side, until the stomach is filled with these leaves, hanging down from every part of it; floating loosely about, and the lower edge of the longest of them reaching into the continuation of the œsophagean canal.

The cuticular covering of these leaves is peculiarly dense and strong, and thickly studded with little prominences; so that when the leaf is examined it exhibits a file-like hardness, that would scarcely be thought possible; and it is evidently capable of acting like a file, or little grindstone. These prominences are larger and harder towards the lower part of the leaf; and, in the central leaves, assume the form and office of little crotchets, or hooks some of which have the hardness of horn, so that nothing solid or fibrous can escape them.

These groups of leaves vary in number in different animals, and the number of leaves constituting each group vary too. They float thickest, and the canal is smallest at the entrance into this stomach, where they are most wanted. Towards the fourth stomach the course is left more open.

As would be expected, from the complicated mechanism of this stomach; it is more abundantly supplied with blood-vessels and with nerves than the second, or even than the first, although that is many times larger than the third.

f. The *abomasum*, or fourth stomach, is lined by a soft villous membrane, like the digestive portion of the stomach of the horse. It also contains a great number of folds, or leaves, somewhat irregularly placed, but running chiefly longitudinally. They are largest and most numerous at the upper and wider part of the stomach; and one of the folds, in particular, is placed at the entrance into the abomasum, yielding to the substances which pass from the third stomach into the fourth, and leaving, as it were, a free and open way, but opposing an almost perfect valvular obstruction to their return. This explains the reason why vomiting is so rare in the ruminant; and that when it does occur, it must be produced by such violent spasmodic efforts as to cause or indicate the approach of death. See *g* and *h*. p. 424.

Towards the lower and narrower part of the stomach these folds are less numerous and of smaller size: they are also more irregular in the course which they take; some of them running obliquely and even transversely.

This coat of the stomach, when the animal is in health, is thickly covered with mucus, while, from innumerable glands, it secretes the gastric juice, or true digestive fluid.

The pyloric or lower orifice of this stomach is guarded by a rounded projecting thick substance, by which the entrance into the intestine is much contracted, and which, indeed, partly discharges the function of a sphincter muscle.

g is a portion of the *duodenum*, or first intestine.

h gives the place where the *biliary* and *pancreatic ducts* enter the duodenum.

i. A stilett is here supposed to be passed through that portion of the œsophagean canal (the very beginning of it,) through which the gullet communicates with the paunch.

k. A stilett is here supposed to run through that part of the canal by means of which the gullet communicates with the second stomach.

l. A stilett here passes below the last, and under the œsophagean canal, showing the situation of the direct communication between the rumen and the recticulum.

m. The supposed direction of the œsophagean canal to the third stomach over the roofs of the paunch and the second stomach.

n. Its passage through the third stomach, and entrance into the fourth.

THE CHANGES OF THE FOOD IN THE DIFFERENT STOMACHS.

The ox rapidly and somewhat greedily crops the herbage, which undergoes little or no mastication, but being rolled into a pellet, and as it passes along the pharynx, being somewhat enveloped by the mucus there secreted, is swallowed. The pellet, being hard and rapidly driven along by the action of the muscles of the œsophagus, falls upon the anterior portion of the œsophagean canal, and its curiously-formed floor; and either by the force with which it strikes on these pillars, or by some instinctive influence, they are separated, and the pellet falls into the rumen, which is found immediately under the base of the gullet, as represented at *c*, p. 424, and *i*, p. 426. The food, however, which thus enters the rumen does not remain stationary in the place where it falls. It has been seen that the walls of this stomach are supplied with muscles of considerable power, and which run longitudinally and transversely, and in various directions all over it, and by means of them the contents of the paunch are gradually conveyed through all its compartments. At first the food travels with comparative rapidity, for the muscles of the stomach act strongly, and the papillæ with which it is lined easily yield and suffer it to pass on; but, the rumen being filled, or the animal ceasing to graze, the progress of the foot is retarded. The muscles act with less power, and the contents of the stomach with greater difficulty find their way over the partitions of the different sacs, and, at the same time, probably, the papillæ exert their erectile power, and oppose a new obstacle.

Some cruel experiments have been instituted in order to ascertain the nature of this muscular action of the coats of the rumen, so necessary to produce this revolution of the food through its compartments. A considerable opening was cut into the flank, immediately over the paunch, and a swinging or balancing motion of that stomach, both upwards and downwards, and forwards and backwards was plainly seen.

The uses of the papillæ seem to be various; they support the weight of the superincumbent food, rough, unmasticated, and liable to injure the coat of the stomach over which it is continually moving; they take away the pressure from the follicular glands of the stomach, and which pressure would render it impossible for these glands to discharge that mucous lubricating fluid, which is requisite for the protection of the stomach and the revolution of the food. The papillæ are consequently more numerous and larger and stronger at the centre or bottom of each of the compartments where the food would accumulate and press most: and they are more thinly scattered, and in some places almost disappear, where there is no danger from the pressure of the friction. In addition to all these, are the important functions of yielding and suffering the food to pass unimpeded along, while the stomach is rapidly filling as the animal grazes, and then by their erectile power retarding that progress when the beast has ceased to eat, and the slow process of rumination has commenced. The glandular bodies, to which allusion has been made, are most plentifully situated, and are of largest size, on the upper part of the sides of the rumen, where they are least exposed to pressure, and may discharge the lubricating mucus which they secrete without obstacle.

The only change that takes place in the food in a healthy state and action of this stomach is that of maceration, and preparation for the second mastication as may be easily proved by taking from the mouth of a cow a pellet that has been returned for rumination and which will be found to be merely the grass, or other food, no otherwise altered than as being softened, and covered with a portion of mucus. The fluid which the rumen contains is not secreted there, but whenever the animal drinks, a portion of the water breaks through the pillars of the œsophagean canal, regulated in quantity either by the will of the beast or by the sympathy of the parts with the state and wants of the stomach, or with the state of the constitution generally. The rumen of a healthy ox always contains a considerable quantity of fluid.

The food, having traversed all the compartments of this stomach, would arrive again at the point from which it started, were it not that a fold of the rumen arrests its course, and gives it a somewhat different direction. This fold is placed at the spot where there exists a communication between the rumen and the reticulum, and which also is guarded by a fold or valve; but the peristaltic motion of the stomach going on, and the food pressing from behind, a portion of it is at length, by a convulsive action, partly voluntary and partly involuntary, thrown over this fold into the reticulum.

The inner coat of the reticulum, or second stomach, has been described as divided into numerous honeycomb-formed cells (they are well represented at *d*, p. 426,) at the base of each of which are numerous small secretoryglands which also furnish a considerable quantity of mucus. The action of this stomach consists in first contracting upon its contents; and, in doing this, it forms the portion just received from the rumen into the proper shape for its return up the œsophagus, and covers it more completely with mucus: then, by a stronger and somewhat spasmodic action, it forces the pellet between the pillars at the floor of the œsophagean canal, where it is seized by the muscles, that are so powerful at the base of the œsophagus, and which extend over this part of the canal, and is conveyed to the mouth. The reticulum, expanding again, receives a new portion of food from the rumen, and which had been forced over the valve by the convulsive action of that viscus.

It is curious to observe the manner in which these acts are performed. The cow is generally found couching on her right side, in order that the intestines which are principally lodged on that side may not press upon and interfere with the action of the rumen. After a pellet that has undergone the process of rumination is swallowed, there is a pause of two or three seconds, during which the cow is making a slow and deep inspiration. By means of this the lungs are inflated and press on the diaphragm; and the diaphragm in its turn presses on both the rumen and the reticulum, and assists their action. Suddenly the inspiration is cut short by an evident spasm; it is the forcible ejection of the pellet from the reticulum and of a fresh quantity of food over the valvular fold to enter the reticulum as soon as it expands again. This spasmodic action is immediately followed by the evident passage of the ball up the œsophagus to the mouth. The spiral muscles of the œsophagus, with their fibres interlacing each other, are admirably suited to assist the ascent as well as the descent of the pellet of food.

This prolonged inspiration is precisely the same as that to which the human being has recourse when he would expel a portion of the gas that distends his stomach.

This account of the construction and function of the rumen will throw considerable light on some circumstances not a little annoying to the practitioner. It has been stated that a portion of the fluid swallowed usually enters the rumen, and that the quantity which actually enters it depends a little perhaps on the will of the animal, more on the manner in which the fluid was administered, but most of all on some state of the constitution over which we have no control. Accordingly it happens, and not unfrequently, and particularly under some diseases of an inflammatory nature, and in which physic is imperatively required, that although it is administered in a liquid form and as gently as possible, the greater part, or the whole of it enters the rumen, and remains there totally inert. Dose after dose is administered until the practitioner is tired, or afraid to give more; and, ignorant of the anatomy and functions of the stomachs, he wonders at the obstinate constipation which seems to bid defiance to all purgative medicines; whereas, in fact, little or none of it had entered the intestinal canal. At length, perhaps, the rumen is excited to action, and ejects a considerable portion of its liquid, and some of its more solid contents, either directly into the œsophagean canal, or through the medium of the recticulum; and which, by an inverted and forcible contraction, is driven through the manyplus and into the fourth stomach, and thence into the intestinal canal, and produces sometimes natural, but at other times excessive and unmanageable and fatal purgation. The great quantity of fibrous substance, which occasionally is found in the dung, warns us that this has taken place.

Occasionally, when dose after dose has been given, and the animal dies apparently constipated, the whole of the physic is found in the rumen. These are difficulties in cattle practice which are not yet sufficiently understood.

When two or three moderate doses have been given, and purging is not produced, the practitioner may begin to suspect that his medicine has fallen through this œsophagean fissure into the rumen; and then, although he does not quite discontinue the physic, he should principally endeavour to stimulate this cuticular, yet not quite insensible stomach. He should lessen the quantity of the purgative, and he should double or treble that of the aromatic and stimulant; and, in many cases, he will thus succeed in producing an intestinal evacuation, the fibrous nature of which will prove the unnatural process by which it was effected.*

It was, perhaps, from observation of the occasional benefit derived from the administration of aromatics and stimulants, even in inflammatory cases, that the absurd and mischievous practice of giving them in every disease, and every state of disease, arose.

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* Mr. Friend, V. S., of Walsall, has, in the 'Veterinarian' for 1833, some exceedingly valuable observations on the practice which he adopted in these annoying and puzzling circumstances.

The reason and the propriety of the administration of cattle-medicine in a liquid form is hence evident. A ball, in consequence of its weight, and the forcible manner in which it is urged on by the muscles of the œsophagus, breaks through the floor of the œsophagean canal, and enters the rumen and is lost. A liquid, administered slowly and carefully, and trickling down the œsophagus without the possibility of the muscles of that tube acting upon it and increasing its momentum, is likely to glide over this singular floor, and enter the fourth stomach and the intestines. A hint may hence be derived with regard to the manner of administering a drink. If it is poured down bodily from a large vessel, as is generally done, it will probably fall on the canal with sufficient force partly, at least, to separate the pillars, and a portion of it will enter the rumen and be useful.

In the calf, fed entirely on its mother's milk, the rumen is in a manner useless, for all the food goes on to the fourth stomach. It is of a liquid form, and it is swallowed in small quantities, and with little force at each act of deglutition. The instinctive closure of the pillars—an act of organic life—(because the milk if suffered to fall into the rumen would be lost, or would undergo dangerous changes there)—has far more to do with the direction of the fluid than any mechanical effect resulting from the form of the aliment, or the force with which it descended the gullet. It is curious to observe the comparatively diminutive size of the rumen, and the development of the abomasum in the fœtal calf.

THE SUBJECT OF RUMINATION, AND THE CHANGES OF THE FOOD RESUMED.

The food, being returned from the recticulum to the mouth, is there subjected to a second mastication, generally very leisurely performed, and which is continued until enough is ground not only to satisfy the cravings of hunger, but to fill the comparatively small true stomach and intestine of the animal; and then, if he is undisturbed, he usually falls asleep. The act of rumination is accompanied, or closely followed, by that of digestion, and requires a considerable concentration of vital power; and hence the appearance of tranquillity and sleepy pleasure which the countenance of the beast presents. Sometimes the process is carried on while the animal is standing, and especially if he is accustomed to, or fears, interruption; and the working ox, if he is not driven too fast, or has not too heavy a load behind him, will ruminate as he walks along. The rumen is rarely or never emptied; and probably the food, that is returned for rumination, is that which has been macerating in the stomach during many hours. The process of rumination is very easily interrupted. Any thing that surprises or frightens the animal will have this effect: even the compelling of the couching beast to rise will suspend it, and it is sometimes a long while before the process is recommenced.

Some persons have had the curiosity to count the number of times that the jaws have moved in the act of grinding the pellet, and these have varied from thirty to forty, according to the time the animal had fasted, or his freedom from interruption; but the portion of food having been sufficiently comminuted, is at length swallowed a second time; and then either being of a softer consistence, or not being so violently driven down the gullet, or, by some instinctive influence, it passes over the floor of the canal, without separating the pillars, and enters the manyplus, or third stomach. This is represented at *b*, p. 423, and *m*, p. 426.

The manyplus presents an admirable provision for that perfect comminution of the food which is requisite in an animal destined to supply us with nutriment both when living and when dead. That which is quite ground down is permitted to pass on; but the leaves, that have been described as hanging from the roof, and floating close over the œsophagean canal, and armed with numerous hook-formed papillæ, seize upon every particle of fibre that remains, and draw it up between them, and file it down by means of the hard prominences on their surfaces, and suffer it not to escape until it is reduced to a puply mass.

These three stomachs, then, are evidently designed for the preparation and comminution of the food before it enters the fourth stomach, in which the process of digestion may be said to commence, and where the food, already softened, is converted into a fluid called *chyme.* The villous coat of the abomasum abounds with small follicular glands, whence is secreted a liquid called the *gastric juice*, and which is the agent in producing this chyme. The change, in all probability, merely consists in the food being more perfectly dissolved, and converted into a semi-fluid homogeneous mass. This form it must of necessity assume before its nutritive matter can be separated. The solution being complete, or as much so as it can be rendered, the food passes through the *pyloric*, or lower orifice of the stomach, into the duodenum, or first intestine, (*g*, p. 426,) where its separation into the nutritive and innutritive portions is effected, and the former begins to be taken up, and carried into the system.

We are now prepared to enter into the consideration of the diseases of this complicated apparatus.

DISEASES OF THE RUMEN OR PAUNCH.

It has already been hinted that the cow, and particularly while she is in calf, is a greedy animal, and will not only choke herself by swallowing broken food, half masticated, or scarcely masticated at all, but will occasionally devour very strange things. Inflammation of the pericardium has not unfrequently been produced by wires from the riddles or sieves which the animal has demolished from mere wantonness, and from needles and large pins that she has picked up. Three very instructive cases of this were given in page 250.

This is particularly the case with the cattle of poor people, and where the women and children live, as it were, among them.

SWALLOWING INDIGESTIBLE SUBSTANCES.

There are some singular records of this depraved appetite, if so it may be called. The museum of the veterinary school at Alfort contains a calculus that was taken from the rumen of an ox, and the nucleus, or central body, around which the vegetable and slimy matter gradually formed and hardened, was a woman's neckerchief, without one laceration in it. In the same museum is a pair of scissors, to which a cow had taken a fancy; and which had worked their way through the coats of the stomach, and at length begun to protrude between two of the ribs, whence they were extracted. It was necessary to break the rivet by which the blades were united, before their removal could be accomplished. Another cow swallowed a similar pair, but these were arrested in their passage down the throat, whence they penetrated into the thorax, and at length protruded between two of the ribs. An old shoe was found in the paunch of an ox; and the lash of a whip, with part of the handle attached to it, began to elevate the left flank of a cow, and was extracted after an incision had been made upon it. An ox, destined to be slaughtered, was led to the abattoir, where the man in attendance had taken off his waistcoat, and left it in the slaughter-house, from which he was called away for a few minutes. On his return the waistcoat was missing, and his companions were accused of the theft, or trick: but it was presently found in the paunch of the beast. A cow exhibited symptoms of choking, and was in extreme distress. There was evidently no obstructing body in the portion of the gullet above the thorax, nor could it be detected lower; yet the symptoms were those only which could be referred to the lodgment of some foreign body in the gullet, or the orifice of the stomach. A large incision was made in the left flank, sufficient for the admission of a man's hand; that incision was carried on into the rumen, and a buckskin glove was abstracted, that had been fixed between the pillars of the floor of the œsophagean canal, between which lies the entrance into the rumen.*

The presence of bodies like these in the rumen cannot fail of being injurious to the animal. They must produce local irritation, interfering with the proper function of this stomach; suspending the process of rumination, or rendering it less effectually performed; and exciting inflammation, probably of the stomach generally as this foreign body is traversing its different compartments, or of some particular portion in which it may be accidentally arrested, and leading on to abscess and perforation of the stomach at that spot. During the strange journey of these bodies through various parts of the frame, previous to their final expulsion, and while they are, as it were, seeking a way of escape, they cannot fail of producing much serious indisposition. The symptoms which would indicate this peculiar cause of disease are not yet sufficiently known; but there must be considerable disturbance when a body sufficiently hard and pointed thus to force its way commences its journey. Inflammation, as conducting to suppuration and destruction of the living substance, must precede its course and make way for it; and as it passes along, the aperture closes, and the wound is healed behind it. The nerves and blood-vessels which lie in its way are, with mysterious skill, unerringly avoided, and as little injury as possible is done to the neighbouring tissues; but local inflammation and pain attend the whole process, which, in many cases, are accompanied by general and severe disease.

It is seldom that medical skill could be of avail here, until the substance approaches to the skin, even if the case were understood. All that can be done is to prevent the animals, as much as possible, from having the opportunity of swallowing these things.

CONCRETIONS IN THE RUMEN.

A more frequent and a more serious complaint is the formation of various concretions in the rumen. They are generally round, but occasionally of various forms, and varying likewise in weight from a few ounces to six or seven pounds. The composition of these balls is also very different. Those which are decidedly peculiar to cattle are composed entirely of hair matted together by the mucous secretion from the follicular glands of the stomach. Sometimes they have no distinct central body; at other times it exists in the form of a bit of straw or wood, or frequently of stone or iron. They exist in the rumen, and in the abomasum. In the abomasum they are composed exclusively of hair, irregularly matted and held together by the mucus of the stomach; in the rumen there is generally a mixture of food, or earthy matter, in the composition of the concretion.

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* Vide Récueil de Médecine Vétérinaire, 1830, p. 324. Mémoires et Observations sur la Chirurgie et la Médecine Vétérinaires, tome ii. p. 360, et Dict. Vétérinaire, par Hurtrel d'Arboval, 'Corps Etrangers.'

When simple food mingles with the hair, the ball seems to be formed by a succession of concentric layers, and in the centre is a bit of nail or stone; or, if the beasts have access to running water, a piece of shell often constitutes the nucleus.

The hair is obtained by the habit which cattle, and even very young calves, have of licking each other. Two cows will sometimes stand for a long time, titillating one another in this manner. A considerable quantity of hair is loosened and removed by the rough tongues of these animals, the greater part of which is swallowed; and there seems to be a kind of power in the stomach to separate these indigestible matters from the other substances which it contains. It is also easy to imagine that the hairs which the manyplus, with all its grinding power, cannot rub down, will collect together when floating in the semi-fluid contents of the fourth stomach, and gradually accumulate in considerable and hard masses.

These balls will begin to form at a very early age of the animal. Mr. Linton, of Bishop's Auckland, found a ball 'as large as his two fists,' in the rumen of a calf that was slaughtered, when only five weeks old. This calf, although it was made sufficiently fat for the butcher, was subject to distention of the rumen, and was always uneasy for the space of an hour after its milk had been given to it.*

When only a little hair enters into the formation of these calculi, they are usually made up of earthy matter, with bits of hay, straw, or other food, agglutinated together by the mucus of the stomach. These have uniformly a hard central nucleus, generally metallic. The concentric layers can here also be traced, but they are, occasionally, somewhat confused.

In some cases, but not so often as in the horse, more of the various compounds of lime, and still more of silicious matter, can be detected by chemical analysis. These concretions are round; they are seldom found except in the rumen, and never in the intestines; and there is always a central nucleus of stone or metal; the concentric layers are regularly and beautifully marked; and the concretion, when sawn asunder, will bear a high degree of polish.

Of the effect of these substances on the health of the animal it is difficult to speak. One thing, however, is certain, that they are often found and in greater numbers in those that are ailing and out of condition, than in stronger and thriving beasts; but whether some fault in the digestive organs, indicated by this poorness of condition, gives a tendency to the formation of concretions in the paunch, or the presence of these concretions impairs the digestive powers and produces general unthriftiness, are questions which it is difficult to answer. Each opinion may in its turn be true, but it is probable that the latter state of things oftenest occurs. However this may be decided, these calculi are not so injurious to cattle as to the horse, because they are, with few exceptions, confined to the stomach, where they may produce a sense of oppression and impairment of appetite, but cannot be the cause of that severe colic, and obstruction, and inflammation, and strangulation of the intestines which destroy so many horses.

DISTENTION OF THE RUMEN FROM FOOD.

Cattle, when first put on succulent grass or turnips, or when suffered to gorge themselves with potatoes or grains, or even with chaff, will sometimes distend the rumen almost to bursting. The disease is recognised in town-dairies by the name of *grain-sick;* in some parts of the country it is termed *maw-bound.*

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* Veterinarian, October, 1833.

The history of the case will generally unfold the nature of it; and it will be distinguished from hoove by its not being attended by occasional eructation, by the swelling not being so great as in hoove, and by the hardness of the flanks. Should any doubt, however, remain, the probang should be passed into the rumen, when, if that is distended with gas, a sudden and violent rush of the imprisoned air will follow. The probang, however, should *always* be used, not only to determine this point, but the degree to which the rumen is distended by food.

When, although the animal may be dull, refusing to eat, and ceasing to ruminate, generally lying down and showing great disinclination to move, yet the pulse is not materially quickened, and the muscle is cool and moist, and there is little heaving at the flanks, and no indication of pain, the practitioner may content himself with a free bleeding and a powerful dose of physic. These symptoms, however, are often treacherous, and, without warning, uneasiness and heaving, and stupor and death, may rapidly succeed. Some farmers place great reliance on *goose-grease*, which is carefully preserved to be used in this complaint; and, it is said, that one pound of it boiled in a quart of milk will give immediate relief. If it does give relief, it is because the goose-grease is an aperient; but a dose of olive or castor-oil would have answered the same purpose, without the danger of poisoning by the deleterious acid that is sometimes developed in this animal matter.

Mr. Parkinson strongly recommends his chamberley and salt, as an effectual remedy for *grain-sick*, which they may use who are not ashamed to administer so filthy a medicine. He, however, very properly adds, that ‘the beasts should be turned into the cow-stand or pasture, exercise being an essential in the cure of this complaint.’ In these milder cases, stimulants may also be resorted to with frequent advantage. Ammonia, ether, aromatics, and ardent spirits, have succeeded in rousing the stomach to action, and establishing the process of rumination; and that once established, there is little fear of the result of the case. These stimulants should, however, be always accompanied by aperient medicines.

When, however, the symptoms are sudden dulness, uneasiness, shifting of posture, moaning, swelling at the sides, the flank feeling hard and not yielding to pressure; when rumination ceases, and the uneasiness and moaning increase, and the animal gradually becomes unconscious, this is a most serious business, and will admit of no delay. It is a case that demands mechanical relief.

The practitioner will probably be able to obtain some account of the nature of the contents of the stomach, and the introduction of the probang will ascertain the degree of distention.

Should the probang enter a little way into the stomach, and the operator be able to move it about, he will have proof that, although the paunch is sufficiently distended to produce severe annoyance and considerable danger to the animal, it is not stretched to the utmost; and he will consider whether he may not first try the effect of mild measures, and he will be especially encouraged to attempt this if he finds that the food is of a rather light nature.

A case related by Mr. Cotcheifer, of Newark,* will best illustrate the method to be pursued. He was consulted respecting two cows that had gorged themselves with eating wheat-chaff, and one of which was already dead. Mr. Cotcheifer, that he might lose no time, first administered a strong purging draught to the living one. He then proceeded to examine the dead cow; and finding that both the first and second stomachs were filled with this chaff, he immediately saw that he must have recourse to other means in order to remove this accumulated food. Reasoning upon the nature of the food, and the distention not being exceedingly violent, he sent home for Read's Stomach Pump, and, having passed the flexible tube into the paunch, he injected a considerable quantity of water. He then attempted to pump out some of the contents which he had thus softened, but he found this to be impracticable, from the lightness and half masticated state of the food, which soon stopped up the syringe; he therefore injected water into the rumen until it began to react upon its contents, and a considerable proportion of them were discharged by vomit. He afterwards threw up a large clyster of warm water, and ordered the cow to be drenched with it several times in the day, and to be moved gently about. The physic, assisted by the clyster, acted freely. On the following day, the cow was better, and she recovered; but it was a considerable time before she fully regained her appetite and condition.

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* Veterinarian, June, 1830.

If the probang cannot be introduced at all into the rumen, or the food eaten is heavy, as grains, or potatoes or corn, the most judicious plan will be to make an incision without delay through the left flank into the rumen, and thus extract its contents.

A case, related by Mr. J. Steel, of Biggar, N. B.,* will form a useful commentary on the advice here given. He was sent for in haste to a cow that was supposed to be very much hoven, and that seemed to be dying. He found indeed every appearance of approaching dissolution. A surgeon had been prevailed on by the owner to puncture her with a trocar, but no air came away; and it was evident (as it would have been by examination with the probang) that the stomach was distended with food. She had been feeding on clover pasture. Mr. Steel, with a decision that did him credit, proposed an immediate opening into the stomach, and the mechanical removal of its contents. He was supported by the opinion of the surgeon; and the owner consented when he was assured that not a moment was to be lost.

Mr. S. made an incision, five inches in length, through the flank into the stomach. The contents immediately came rushing out in a large stream, and continued doing so for some time; and when it stopped coming of itself, he introduced his hand, and removed a great deal more of it; and he says that the quantity of this indigested mass that was taken out was almost incredible. He then stitched up the wound, abstracted some blood, and gave a purgative. Some days having elapsed, and the bowels not acting, and the cow not feeding, he examined the state of the rumen through the wound, some of the stitches having given way. He found that the portion of the food, which was not removed, was lying in large hard masses in the paunch. He was unwilling to open the whole of the wound afresh; but, with the point of a long syringe, he broke down these masses as well as he could, injected a good quantity of warm water, and gave a smart dose of physic, which acted briskly. On the next day, she was evidently better, and continued to improve; and, at length, in spite of a severe catarrhal fever, which was brought on by an accidental cause, she perfectly recovered.

This mode of proceeding, however, is recommended only in cases of extreme distention with heavy food. The rumen of cattle, with few blood-vessels and nerves, will endure very severe treatment without serious injury. The principal danger is, and it exists to a considerable extent, that a portion of the food will, during the extrication of the rest from the stomach, fall into the abdomen, and there remain a source of irritation, and the unsuspected cause of serious and fatal disease when the fears of the owner had completely subsided.

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* Veterinarian, February, 1834.

A beast that has been subjected to this operation, or, indeed, whose paunch has been distended to any considerable degree, should be prepared for the butcher as soon as possible, or sold almost immediately, if in tolerable condition: for a stomach, whose muscular fibres have been so stretched and enfeebled, will not soon do its full duty again; or a small portion of food, which, notwithstanding the most careful management may fall into the belly, will sometimes, after a while, produce inflammation of the intestines, and death.

HOOVE, OR DISTENTION OF THE STOMACH FROM GAS.

If a beast, taken from poor or less nutritive food, is put upon clover, or turnips, or rich-fog, it eats so greedily and so much, that the rumen ceases to act. These green vegetable substances are naturally subject to fermentation, during which much gas is extricated, but when inclosed in the stomach and exposed to the combined influence of heat and moisture, the commencement of the fermentation is hastened, and its effect increased.

The "Hoove" or "Blown" is distention of the rumen, by gas extricated from substances undergoing the process of fermentation within it. In a healthy discharge of the functions of the stomach, the food simply undergoes a process of maceration or softening; but if the food is retained in the stomach longer than the usual period, it, or perhaps only a portion of the juices which it contains, begins to ferment; or, as in animals with simple stomachs, even this preparatory one may so sympathise with certain states of the constitution, as either to secrete an acid principle, or to favour the development of it in the food. It is from this cause that some degree of hoove accompanies most fevers, it has been seen that it is the consequence of general irritation produced by obstruction of the œsophagus; and it sometimes accompanies difficult parturition, and to such an extent, that it is necessary to puncture the rumen before the calf can descend sufficiently low into the pelvis to be extracted.

Its most frequent cause, however, is that which has been just stated, namely, the turning of a beast from poor, or less nutritious food, into plentiful and luxuriant pasture, when he frequently eats so greedily, and so much, that the stomach is overloaded, and is unable to circulate the food through its cavities, and from the combined action of heat and moisture its contents speedily ferment, and gas is extricated. The following are the symptoms:—

The animal gradually becomes oppressed and distressed. It ceases to eat; it does not ruminate; it scarcely moves; but it stands with its head extended, breathing heavily, and moaning. The whole belly is blown up; this is particularly evident at the flanks and most of all at the left flank, for under that the posterior division of the rumen lies. When the effects of this distention of the stomach in the horse were described, a determination of blood to the head was spoken of as an early and a fearful symptom. Many blood-vessels go to the stomach of the horse, and it is richly supplied with nervous influence, therefore the brain soon sympathises with this overloaded organ, and *staggers* are produced. It has been shown, however, that the rumen in cattle is scantily supplied with either blood-vessels or nerves, and therefore the brain is seldom much affected in an early stage of hoove. Swelling, unwillingness to move, and laborious breathing, are the first and distinguishing symptoms. In proportion as the stomach becomes distended by the extricated gas, the case becomes more desperate, not only from the pressure on the other contents of the abdomen, thus impeding the circulation of the blood; and also on the diaphragm, against which the rumen abuts, and thus impeding respiration, and also the danger of rupture of the paunch, but the construction of the œsophagean canal renders it manifest that the rumen will be more obstinately closed in proportion as it is distended. It is the relaxation of the muscular fibres which causes the two pillars that constitute the floor of the canal and the roof of the rumen to be easily opened, either for the admission or the return of food; but when the stomach is filled and elongated, as well as widened, these fleshy pillars must be stretched, and in proportion as they are distended, will they be brought closer to each other, and firmly held there. Two cords, tied together, at the ends, may be easily separated from each other in the centre, when they are loosely held; but if they are tightly stretched, they are brought close together, and the difficulty of separating them increases with the tension.

This every-day illustration may explain the seeming difficulty of the rumen becoming thus dangerously distended, with these moveable pillars in its roof. When the rumen is filling, there are occasional eructations of a sour or fœtid character; but when the stomach is once filled, there is no longer the possibility of escape for its contents.

The animal cannot long sustain this derangement of important parts; inflammation is set up, and the circulation becomes seriously and dangerously disturbed by this partial obstruction. Affection of the brain comes at last, characterised by fulness of the vessels, hardness of the pulse, redness of the conjunctiva, and protrusion of the eye. The tongue hangs from the mouth, and the mouth is filled with spume. The beast stands with his back bent, his legs as much as possible under him; and he gradually becomes insensible—immoveable—he moans—falls—struggles with some violence, and, as death approaches, some relaxation of the parts ensues, and a quantity of green sour liquid, occasionally mixed with more solid food, flows from the mouth and nose.

There can be no dispute as to the first object to be accomplished, in order to save the animal; the gas must be liberated or otherwise got rid of. Some persons, when symptoms of hoove appear, drive the animal about, and keep him for a while in constant motion. This is particularly the case with sheep. It is supposed, that in the motion of all the contents of the abdomen, while the animal is moving briskly about, the pillars of the roof of the paunch must be for a moment relaxed, and opportunity given for the gas to escape into the œsophagean canal, and through the gullet; and this will, undoubtedly, be the case to a certain degree. In sheep, that can be more easily driven about than oxen, this is sometimes effectual; but the ox cannot without much difficulty; and often not at all, be induced to move with rapidity, which is necessary to produce concussions sufficiently powerful to shorten and disunite the muscular pillars. There must also be some danger of rupturing the stomach so much distended, or the diaphragm, against which it is pressing, by the very production of these concussions.

In some parts of Leicestershire, the farmers still retain the old method of very effectually producing these shocks: pails-full of cold water are thrown one after another on the beast. A violent eructation follows, and the animal is relieved; but it unfortunately happens that the stomach now and then gives way, instead of the pillars of the œsophagean canal, and the patient is lost.

Some writers recommend the administration of vinegar, the propriety of which admits of much doubt, for the fluid contained in the stomach is already sufficiently acid.

Others have recommended alkalies, and described them as almost a specific. Ammonia has been extolled as seldom failing to give relief. It may be conceded, that the alkali would be likely to neutralise the acid contents of the stomach; but there is one objection to it, (another will be stated presently,) viz., that the same closing of the roof of the rumen, which prevents the escape of the gas, would also prevent the entrance of the alkali, which would, consequently, pass on to the third and fourth stomachs, where there is no acid for it to neutralise.

Oil (whether olive, or spermaceti, or castor, or common whale oil, seems to be a matter of indifference) will sometimes prove serviceable in cases of hoove; but it is either at the very commencement, before the muscular pillars are tightened, and when a portion of it can enter the paunch, and produce a disposition to vomiting or purging; or, if the whole passes on into the fourth stomach, and so into the intestinal canal, a sympathetic but inverted action is excited in the rumen, and a portion of its contents is sent, by an unusual passage, from the rumen through the third and into the fourth stomach, and so relief is obtained. In this way purging is occasionally established, either in consequence of a stimulus applied immediately to the coats of the first stomach, or from sympathy with the action going forward in the intestinal canal, a portion of the food is carried from the rumen into the intestines without being returned to the mouth to be remasticated. The grassy and harder fibres, sometimes found in the dung in considerable quantities, prove that that portion of it could not have undergone rumination. This, however, is not striking at the root of the evil.

The object to be accomplished is the extrication of the gas, and the prevention of any fresh quantity of it being developed. If the farmer or the practitioner, at a distance from home, sees any of his cattle so dangerously hoven or swelled as to threaten speedy death, he adopts a summary mode of getting rid of the gas: he takes a sharp-pointed knife, and plunges it into the left flank, underneath, and in contact with which the rumen is found. The gas rushes violently through the aperture, carrying with it steam, and fluid, and pieces of food. The belly falls, and the beast is immediately relieved. The safest place for this operation is the following:—Supposing a line to be drawn close along the vertebræ, from the haunch-bone to the last rib, and two other lines of equal length to extend down the flank, so as to form an equilateral triangle; the apex of the triangle, or the point where these lines would meet, would be the proper place for the operation, for there is no danger of wounding either the spleen or the kidney.

It may also be suggested, that a small trocar is far preferable to a knife for this operation, and might very conveniently be carried in the instrument-case of the surgeon, or the pocket of the farmer. It consists of a short strong stilett, terminating in three cutting-edges converging to a point, and having a handle that may be grasped with some force. To this is accurately fitted a silver canula or tube, reaching from the termination of the three edges to the handle. It is, in fact, the instrument used by human surgeons in tapping for dropsy. This is plunged into the flank; the stilett is then withdrawn, and the canula remains as long as the operator pleases, and may be secured by tapes attached to two rings at the base of it, and tied round the body of the animal.

The gas is certainly extricated in this way, and generally successfully so. When gas ceases to escape, it may be taken for granted that the manufacture of it has ceased in the rumen; the trocar may then be withdrawn, and the wound will speedily heal. There are, however, occasional bad consequences, which are altogether unsuspected by the farmer or the practitioner. At the commencement of the operation, when the inside of the flank is in close contact with the paunch, the gas, fluid, and fibrous matter will all be safely thrown out through the two wounds, for, lying upon each other, they are but as one; but when the stomach is partially emptied of the gas, it sinks, and is no longer in contact with the parietes of the abdomen. The gas and particles of solid food continue to be discharged for a considerable time after this; and although the greater part may be ejected with sufficient force to be driven through the aperture in the flank, yet some portion will necessarily fall into the abdomen and remain there. This will, ere long, become, a source of considerable and dangerous irritation; slow or rapid in its progress and effects, according to the quantity of food that has escaped from the stomach into the abdominal cavity: accordingly it happens, that although the beast may appear to be perfectly relieved by this operation, he does not thrive well afterwards, and in the course of a few weeks or months, sickens and dies of some obscure disease, but which is principally referrible to inflammatory affection of the abdomen. Therefore, the farmer or practitioner who has faith in an occasional recourse to the mode of cure by puncturing the rumen should always carry a trocar with him, for the canula penetrating three or four inches into the abdomen would form a continuous passage between the rumen and the flanks, notwithstanding the subsidence of the former, and would prevent the escape of any portion of the contents of the rumen into the abdomen.

Although a portion of the gas may be liberated by this operation, yet the process of fermentation may proceed. The gas may escape, but that which would furnish a long, continued, and annoying, and dangerous supply of it remains. Then the advocates for paunching carry their operation a little farther. They enlarge the aperture into the paunch, until, as in bad cases of maw-bound, they can introduce their hand, and shovel out the contents; and, as before stated, the stomach, from its comparative insensibility, and want of vitality, bears all this without any considerable inflammation or danger; there is, however, as in the simple paunching, danger from the escape of a portion of the contents into the cavity of the abdomen.

This larger opening into the rumen should never be attempted except by a veterinary surgeon, or a person perfectly acquainted with the anatomy of cattle, and the precise situation of the viscera of the belly. A cow had eaten a great quantity of lucern, and was hoven. A neighbour, who was supposed to know a great deal about cattle, made this large incision into the paunch: the gas escaped, a great portion of the food was removed, and the animal appeared to be considerably relieved, but rumination did not return, and on the following day the animal was dull—she refused her food, but was eager for drink—she became worse and worse—and, on the sixth day, she died. She was examined after death; and one of the kidneys was found to be punctured, and the peritoneum in the neighbourhood of the wound was black with inflammation.

The French Practical Journal of Veterinary Medicine (for 1829, p. 390) contains a case in which the cow was destroyed by the operation, although the larger opening was not resorted to, and even a rude kind of canula was used. A cow that was hoven was punctured by the shepherd with his knife. The gas escaped, and the animal was relieved; but whether the man had made the opening into the rumen too large, or had irritated the wound by holding it open with his fingers, while some one procured a hollow piece of elder to be introduced as a canula into it, the cow was evidently ill on the following day, and became rapidly worse, and exhibited symptoms of inflammation of the bowels, and, on the seventh day after the puncturing, was so bad, that she was destroyed. Several gallons of fluid were found in the belly, with a considerable quantity of half-chewed food swimming in it: many portions of the small intestines were highly inflamed, and the peritoneum generally was so, and particularly in the neighbourhood of the wound.

It was the knowledge of facts like these, (and similar ones must have occurred in the experience of every practitioner,) that produced the conviction that the practice of puncturing the rumen was not so simple and so free from danger as some had imagined, and led to the invention and use of the *probang* and *stomach-pump*. The tube (fig. 1, *a*. p. 417) is introduced into the mouth, and is passed down the throat, with the rounded extremity, *e*, downwards, and is forced on through the pillars of the œsophagean canal: the stilett is then withdrawn, and the gas rushes violently out. The tube is continued in the mouth until the belly sinks, and little gas escapes: the animal is greatly relieved, and if it begins to swell again, the probang is once more introduced. But the tube cannot remain in the mouth and gullet for any great length of time; and when it is withdrawn, the manufacture of gas may continue undiminished, and the relief be only temporary, and so far the probang may be in some degree inferior to the trocar.

The practitioner then has recourse to the stomach-pump, and he throws in a considerable quantity of warm water, and pumps it out again; and repeats the operation until he has washed away all the acid fermenting fluid, and then usually the process of rumination recommences, and the animal does well. Sometimes he so overcharges the stomach that vomiting is produced, and a great portion of the contents of the rumen is thus discharged.

Hoove, however, had long been considered to be a case in which the aid of chemistry might be resorted to with considerable benefit; and alkalies were thrown into the stomach to neutralise the supposed acid principle which then prevailed. The carbonate of ammonia was a favourite medicine for this purpose; but they who were deluded by this supposed application of chemistry, forgot that the necessary consequence of the combination of the alkali with the acid would be the extrication of an immense volume of gas, of a different nature indeed, but which would still more distend the rumen, and that even to bursting. As, however, a very small portion of it, if any, enters the rumen, it will principally do good, and much good it frequently does effect by its stimulant effect on the fourth stomach, propagated by sympathy to the first.

Acids are resorted to by other practitioners, but it would be difficult to say on what principle, except their stimulant effect on the rumen, and thus rousing it to contract, if possible, upon, and expel its contents. More powerful stimulants than the acids are with great propriety adopted by another set of practitioners, and peppermint, wine, and even ardent spirits are freely administered, and in many cases with beneficial effect, and especially when they can be got into the rumen.

At length it occurred to some inquiring men to turn their chemistry to better account by an analysis of the gas that was so rapidly and abundantly extricated, and the extrication of which was the source of all the mischief. It had been suspected that it consisted principally of hydrogen;

for when a lighted candle had been accidentally brought into contact with the vapour as it rushed from the aperture in the flank, the gas immediately caught fire. Careful analysis indicated that the gas was differently combined, in different stages. In recent hoove it consisted chiefly of carburetted hydrogen—the union of carbon with hydrogen; in more chronic cases there was a mixture of sulphuretted hydrogen—the union of sulphur and hydrogen; and, in proportion to the continuance of the hoove, the sulphuretted hydrogen increased, and at length prevailed. In both cases hydrogen was the chief constituent.

Then came the inquiry, whether something might not be introduced into the stomach which would combine with the gas already extricated, and cause it to disappear, and also prevent its future accumulation, by combining with it as soon as it was produced. Chlorine suggested itself to the mind of the inquirer, between which and hydrogen a very strong affinity prevailed, and which rapidly combined with hydrogen, and formed muriatic gas, while this new and compound gas was immediately absorbed by water, and became muriatic acid.

There were, however, some obvious difficulties attached to the administration of chlorine; for, in the form of gas, it is destructive to life, and even when combined with water, it produces speedy and dangerous inflammation of the stomach and bowels. The muriatic acid also—the result of the combination of the chlorine and the hydrogen and water—was not a very harmless thing in the stomach of the horse, or of cattle.

A method, nevertheless, was soon discovered, by which it might be administered with perfect safety and admirable result. Chlorine had affinity for various substances, as lime, potash, and soda; and its combination with either of these could be substituted for the unmanageable and destructive chlorine. When introduced by means of the stomach-pump into the rumen, the chlorine would separate itself from the alkali, and combine with the hydrogen, for which it had a more powerful affinity, and formed muriatic gas. This gas had a strong affinity for water, and would be quickly absorbed by the fluid always contained within the stomach; and so, quitting its gaseous for a fluid form, it quickly disappeared, or would not retain a thousandth part of its former bulk, and muriatic acid would be formed. At the same time, the lime or potash, or soda, (according to the combination that was used,) would be liberated; yet no danger would result from the presence of this corroding acid and caustic alkali; for there was a chemical affinity between them which would be soon exerted, and the harmless and inert muriates of lime or potash, or soda, would be produced. This was not mere theory, but when brought to the test of practice was verified in every particular; and hence resulted one of the most important improvements in cattle-medicine that modern times have produced.

The chloride of lime is as good as either of the others, and should always be in the possession of the farmer and practitioner, not only for this purpose, but because, in cases of foul, fœtid ulceration, and gangrene generally, it is the most powerful disinfectant, and the most useful stimulant that can be applied. The proper and safe dose is two drachms of the powdered chloride of lime dissolved in two quarts of water, and injected into the paunch by means of the stomach-pump. This may be repeated an hour afterwards, if circumstances should appear to require it.

The trocar will then supersede the use of the knife and the lancet, when, under circumstances of emergency, the practitioner may be compelled to act promptly; for, by the continuance of the canula in the wound, some of the distant and unsuspected results of the common method of puncturing the rumen may be avoided; but when the practitioner is near home, or can obtain speedy access to his stomach tube and pump, the trocar will be completely discarded.

The animal having been relieved, and the gas ceasing to distend the paunch, a pound of Epsom salts should be administered with an ounce of carraway powder, and half an ounce of ginger; and, on several successive mornings, four ounces of Epsom salts, two of powdered gentian, and half an ounce of ginger, should be given. The object of the practitioner, or the owner, should be to restore, as speedily, and as effectually as possible, the tone and action of the rumen. The return of the process of rumination will show when that is beginning to be effected, and rumination will usually precede the desire to eat.

Attention should for some time be paid to the manner of feeding. A mash should be daily allowed, and the pasture on which the beast is turned should be short and bare, rather than luxuriant. It should also be kept in mind that the over-distended stomach of the hoven beast will not soon, and in most cases will never, quite revover its former energy; and that, if the beast is in tolerable condition, it should be sent to the butcher, or it should be got ready for the market as quickly as that can with safety be effected.

One of the most singular cases of hoove that we have on record is contained in one of the French periodicals.* A cow that had been turned into the pasture in perfect health, was found, in the course of the morning, labouring under great excitation, making frequent and violent efforts to vomit, and then galloping over the field with her mouth half open, and the saliva running from it as if she were mad. The eyes were haggard and fixed, and starting from their orbits, and the nostrils were unusually dilated. When she stood still her back was bowed, but presently she would stretch herself out, and bound away over the field. Her paunch began speedily to swell, and she moaned dreadfully, and could not be still for a moment.

The practitioner, not having a trocar, punctured the rumen with a bistoury. A vast quantity of gas rushed violently out; the enlargement of the abdomen subsided, and she appeared to be perfectly at ease; but presently the efforts to vomit recommenced, and the aperture into the paunch being accidentally closed, she begun rapidly to swell again. The practitioner now suspected that the cause of all this mischief was concealed somewhere in the gullet, or the entrance into the first stomach. He carefully examined along the whole extent of gullet in the neck, but could not detect any obstruction. He then opened the mouth, and raised the head, in order to introduce a flexible osier rod into the gullet, when the animal again making a sudden and more violent effort to vomit, he saw the tail of a snake in the posterior part of the mouth. He seized it immediately with his right hand, and, steadying himself by laying firm hold of the horn with his left hand, he drew it out: it was dead, and measured three feet and eleven inches in length. There was no appearance of bite or wound upon it, but it was covered with a greenish spume. The efforts to vomit immediately ceased, the hoove disappeared, and the cow began to ruminate, and steadily regained her appetite and spirits.

Sucking calves are occasionally subject to hoove. Little more will be necessary in this case than the introduction of the probang. This distention of the rumen arises from some accidental and temporary cause, and there is rarely any continued manufacture of gas within the stomach

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* Recueil de Méd. Vét. 1826, p. 403.

Some calves become blown from the trick which they frequently have of sucking each other's pizzle or ear. It is curious to see with what eagerness they will do this, and how quickly they blow themselves up by the air which they draw in and swallow. The introduction of the probang will be sufficient here, but it will be prudent to separate the animals.*

LOSS OF CUD.

The cessation of rumination, designated by the term "the loss of cud," is more a symptom of disease, than a disease of itself. It accompanies most inflammatory complaints, and is often connected with those of debility. It will be the duty of the practitioner to ascertain the cause of this suspension of second mastication, and to adapt his mode of treatment to the nature of that cause. A dose of physic, with a very small portion of aromatic medicine, will be indicated if any fever can be detected; more than the usual quantity of the aromatic will be added in the absence of fever, and still more, with tonic and alterative medicine, if general debility is indicated. The carraway and ginger powder are the best aromatics that can be employed and will supersede every other: the gentian and ginger, with Epsom salts, as recommended in page 444, will prove a very useful tonic and alterative, in cases of "loss of cud" that cannot be traced to any particular diseased state of the animal, or that seems to be connected with general debility.

INFLAMMATION OF THE RUMEN.

In almost every book on cattle-medicine mention is made of "inflammation of the stomach;" and certainly cases do, although but rarely, occur, in which evident traces of inflammation of the rumen may be discovered on examination after death. The cuticular coat is not discoloured, but it peels from the mucous coat below at the slightest touch, and that coat is red and injected. This is particularly the case when a beast dies soon after apparent recovery from distention of the stomach by grass, or when he is destroyed by the accumulation of solid food that could not be removed. It is likewise found in every case of poisoning, but the symptoms during life are so obscure that it would be useless to bestow further time on the consideration of this disease.

POISONS.

Nature has endowed the brute with an acuteness of the various senses, and with a degree of instinct which, so far as the life and enjoyment and usefulness of the animal are concerned, fully compensate for the lack of the intelligence of the human being. The quadruped is scarcely born ere he is mysteriously guided, and without any of the lessons of experience, to the kind of food which affords him the most suitable nourishment, and he is warned from that which would be deleterious. There is scarcely a pasture which does not contain some poisonous plants, yet the beast crops the grass close around them without gathering a particle of that which would be injurious. In the spring of the year, however, and especially after they have been kept in the stall or the straw-yard during the winter, and supported chiefly on dry food, as soon as they are turned into the fields cattle eat greedily of every herb that presents itself, and frequently are seriously diseased, and sometimes quite poisoned. They are under the influence of appetite almost ungovernable, and few plants have then acquired their distinguishing form and colour, and taste and smell. It has already been stated (p. 310) that when Linnæus visited Tornea, the inhabitants complained of a disease which destroyed many of their cattle, and especially if, during the spring, they were turned into a particular meadow in the neighbourhood. He soon traced the disorder to the water-hemlock, which grew plentifully in that place, and which the cattle in spring did not know how to avoid.* The common and water-hemlock, the water dropwort, and the yew, are the principal plants that are poisonous to cattle; but it said that the common crow-foot, and various others of the ranunculus family, are occasionally destructive. The writer of this treatise recollects losing one cow that had fed on the wild parsnip, and another by black henbane; and there is a case on record in which eight cows were poisoned by the stalks of the wild poppy.†

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* It is amusing to observe the strange notions which some persons have formed of this disease and its treatment. Mr. Parkinson contends that it chiefly arises from the glands of the mouth being over-abundantly supplied with saliva, which, passing continually down the throat the stomach becomes too full, and the end of the gullet or windpipe is stopped, so as to prevent the passage of the wind or breath. (What strange activity of the salivary glands, even to fill the enormous cavity of the rumen, and to stop the end of the gullet or windpipe! Excellent anatomy! The mode of cure is worthy of it.)

'I am convinced it is solely occasioned by a too abundant flow of saliva in the stomach. I have myself been much troubled with this complaint, for which, after trying many things prescribed by the faculty, I found an effectual remedy in smoking tobacco. This I do immediately after every meal, spitting as much as possible. Any stick with a knob thrust down the throat will give ease; but I much approve of tar being administered as, from its nauseous quality, it will cause the animal to throw up much saliva—(I have known them to discharge as much as a quart at a time)—and affords an effectual and immediate relief.'—Parkinson's Treatise on Live Stock, vol. i. p. 238.

The symptoms of poisoning by these acrid and narcotic plants are obscure, unless they can be connected with the history of the case. They are principally sudden swelling, with a peculiar stupor, in the early stage of the attack; cessation of rumination; a change in the quality of the milk, which becomes thin and serous, and presently ceases to be secreted; the refusal of all solid food, and eagerness after water; quickening of the pluse, which yet becomes small, and, in some cases, scarcely to be felt; and the animal frequently grinds his teeth, and paws, and rolls, as if it felt severe colic pains. In a few instances the stupor passes over, and a degree of excitement and blind fury succeeds, which has been mistaken for madness.

On examination after death, the greater part of the poison is usually found in the paunch, but, in a few cases, it has been remasticated, and conveyed into the fourth stomach and intestines. The sense of taste does not seem to be very acute in cattle; it is a sleepy kind of pleasure which they feel in rumination, and the acrid and bitter flavour of many a plant appears to give them little annoyance.

Inflammation is found in the paunch and second stomach characterised by the ease with which the cuticular coat is separated from that beneath. The manyplus is usually filled with dry and hardened food; and the fourth stomach and intestines exhibit inflammation and ulceration proportioned to the acrimony of the poison, and the quantity of it which had passed into these viscera.

The yew is probably the most destructive poison, especially when a quantity of it is taken unmixed with other food. Mr. Husard, however, relates that, in Hanover and Hesse, the cattle are partly fed on the leaves of the yew. He examined the trees as they grew in the mountains of those countries, and he found them to be the true yew. In winter, and especially when fodder is more than usually scarce, a portion of yew leaves and branches is mingled with the other food. The quantity of the yew is small at first, but it is gradually increased until it constitutes the greater part of the food; and it has the reputation of materially contributing to the fattening of the beast.

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* Lachesis Laponica, vol. ii. p. 136.

† Recueil de Méd. Véterinaire, Oct. 1829, p. 99.

The inhabitants of Hanover and Hesse are, nevertheless, perfectly aware of the poisonous property of the leaves of this tree, and are sometimes taught, by dear experience, that it will destroy their cattle, unless it is managed with this degree of caution.

M. Husard adds, that on his return to France he determined to put this matter to the test, but he selected the horse instead of cattle as the subject of his experiment. He gave the yew mixed with oats in the proportion of half a pound of the former to a pound and a half of the latter, and the horse did not appear to be in the slightest degree inconvenienced by what he had eaten.

This animal, however, was enfeebled and emaciated previous to the experiment; and it occurred to M. Husard that there might be a deficiency of sensibility in the stomach, and in the frame generally, and that, in consequence of this, the poison might not produce its fatal effects: he, therefore, selected a mare in good health and condition, as the subject of a second experiment. She ate the mingled yew and oats, and suffered no inconvenience.

He selected another horse as the subject of a third and decisive experiment. He took seven ounces of the yew, and bruised and mixed it with twelve ounces of water, so as to make a kind of electuary, which he gave to a horse that had fasted four hours; an hour afterwards he fell and died.*

The British agriculturist will scarcely be tempted to make experiments like these, except in times of the greatest scarcity, and then he would act with all the caution of the Hanoverian, for several instances occur to the recollection of the writer in which the presence of a considerable quantity of other food in the rumen did not preserve the beast from the fatal effects of the yew. Fortunately, it is seldom that cattle browse upon the green yew; the mischief is usually done by the half-dried clippings of the yew-trees, or hedges, which are too often suffered to lie in the way of cattle, and which they will eat, if not with avidity, yet freely.

Little can be done in the way of medicine when cattle have browsed on these poisonous plants, and the only hope of the practitioner must be founded on the early and persevering use of the stomach-pump. Plenty of warm water should be injected and pumped out, and that repeated again and again; and at length the stomach should be fully distended with water, for the purpose, and in the hope of, producing vomiting, as in Mr. Cotcheifer's case. Whether this succeeds or not, a brisk purgative should be next administered, but as cautiously and gently as possible, that it may pass on over the closed floor of the œsophagean canal into the fourth stomach, and not, by the power with which it descends, force open the pillars that compose that floor, and enter the rumen and be lost. Tonics and aromatics will here also follow the evacuation of the stomach, in order to restore its tone.

While speaking of poisons, it will, perhaps, be proper to mention that cattle are sometimes exposed to extreme danger from the application of deleterious mineral preparations for the cure of mange and other cutaneous eruptions. A practitioner had been attending on some mangy cows; he had applied the usual preparation of sulphur mixed with a portion of mercurial ointment, and the animals were decidedly getting better, although not so rapidly as the impatient owner desired. The gentleman became dissatisfied, and another person was called in, who freely applied a lotion to the sore and mangy spots; but before he had dressed the last of the cows, the first became suddenly and violently ill, and died. The former practitioner was sent for in great haste, but ere he had arrived, three had died, and he came just in time to witness the death of a fourth. They were all dead in less than two hours after the external application of the lotion. He found the bottle with a portion of the lotion remaining in it, which he carried away, and appointed the following morning for the opening of the animals, to which he desired that the second man should be summoned, and arriving at his home, he set to work to analyze the contents of the bottle. Combined with some unknown vegetable matter, he found a nearly saturated solution of corrosive sublimate. On the following morning the post-mortem examination took place. Considerable inflammation of the first and second stomachs was found, evidenced by the ready separation of the cuticular coat; the fourth stomach and the intestines were ulcerated, and in many places nearly perforated. The gas which proceeded from the abdomen and rumen was of so poisonous a character that the butcher who opened the animals, although warned of his danger, yet exposing himself to the blast of the gas as it escaped, had erysipelatous swelling of the face and head, which threatened his life. The cows were poisoned by the application of the mercurial wash to the mangy and abraded spots.

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* Instructions sur les Maladies de les Animaux Domestiques, tome vi. p. 300.

It is no unusual thing for cattle that have been incautiously dressed with a strong solution of corrosive sublimate to become seriously ill. They cease to eat and to ruminate; the saliva drivels from their mouths; they paw with their feet; look anxiously at their flanks, and are violently purged—blood usually mingling with the fæces.

The remedy, if there is time and opportunity to have recourse to it, is the white of several eggs, beaten up with thick gruel, and gently poured down the throat, that it may be more likely to pass on to the fourth stomach; and this repeated every hour, until the animal is either relieved or dead. As soon as decided relief is obtained, a dose of physic should be given, and if any fever seems to be coming on, a few pounds of blood should be taken away.

It is scarcely possible that cattle should suffer from the poison of arsenic, unless it is maliciously administered, for it ought not to enter into the composition of any medicine, or external application. The antidote would be lime-water, or chalk and water plentifully administered.

DISEASES OF THE RETICULUM.

Of these, in the present state of knowledge of cattle-medicine, little can be said. Some of the foreign substances that are found in the rumen have been occasionally discovered in the reticulum, as pins, pieces of wire, nails, small stones, &c. They were, probably, ejected over the valve between the two stomachs, enveloped by, or attached to, the portion of food that was preparing for a second mastication. In the forcible contraction of the stomach, it has been severely wounded by these substances, and so much inflammation has ensued, that the animal has been lost. The following narrative, by M. Dupuy, director of the Veterinary School at Toulouse, which is almost exclusively devoted to the consideration of the diseases of cattle, will form a sufficient illustration of this. A bull, three years old, died after an illness of fourteen days. The symptoms scarcely extended beyond the peculiar heaving and short cough of hoove.

On examination, after death, it was found that the second stomach adhered to the diaphragm by a false membrane, which was clearly the consequence of intense inflammation of that stomach. The coats of the reticulum had been pierced, and in the aperture was a piece of iron wire, that had penetrated through the diaphragm and the pericardium, and entered the right ventricle of the heart. Within the diaphragm, and between it and the heart, was a sac containing nearly a pound of blood mingled with the liquid food usually contained in the second stomach.

The mischief had been of long standing, for the walls of the ventricle were become white and of a cartilaginous structure, and the ventricle itself was filled with coagulated blood deposited layer upon layer. The pericardium was contracted and adhered to the heart, and might almost be said to have disappeared. The lungs were emphysematous, and contained numerous encysted tubercles resembling hydatids, or actually being so.

The writer of this treatise has frequently seen inflammation of the second stomach—sometimes accompanying that of the paunch, and at other times seemingly confined to the reticulum. This inflammation was, as in the rumen, characterised by the peeling off of the cuticular coat, and the redness of the tissue beneath it; but the symptoms were so different in different cases, and always so obscure, that no legitimate conclusion could be drawn from the appearances that presented themselves.

DISEASES OF THE MANYPLUS, OR MANIFOLDS.

Although the function of this stomach is one of a purely mechanical nature, there seems to be a strong bond of sympathy between it and almost every part of the frame. There are few serious diseases by which cattle are afflicted, and there are none of an acute and inflammatory nature, in which the manyplus is not involved. It is so common in cases of catarrh, constipation, inflammation of the lungs, or bowels, simple fever, dropping after calving, blain, and even murrain, to find the manyplus either choked with food in a hardened state, or, if continuing soft, yet having become exceedingly putrid and emitting a most nauseous smell, that the idea of the animal being *fardel-bound*, or having disease of the *faik* is always present in the mind of the farmer and the country practitioner. They are seldom wrong in this surmise, for the fardel-bag either sympathises with the diseases of other parts, or is the original seat and focus of disease.

The manyplus has been described as containing numerous leaves or curtains or duplicatures of its cuticular coat, and with interposed layers of muscular and vascular tissue, which hang from its roof and float loose in its cavity. These leaves are covered with innumerable little hard papillæ or prominences; and many of these, and especially toward the lower edges, assume a greater degree of bulk, and something of a hook-like form. Those portions of food that are returned after the second mastication, and that have not been thoroughly ground down, are seized by these hooked edges of the leaves and drawn up between them, and there retained until, by the action of these flexible grindstones, they are sufficiently comminuted for the purpose of digestion.

It is easy to imagine that, either sharing in the irritability of other parts, or being the original seat of irritation and inflammation, the manyplus may spasmodically contract upon, and forcibly detain the substances that have been thus taken up between its leaves. By this contraction the natural moisture of the food, or that which it had acquired in the processes of maceration and mastication, is mechanically squeezed out, or drained away by the very position of the leaves, and a hard and dry mass necessarily remains. When the contraction is violent, and this imprisonment of the food long continued, we can even conceive of the possibility of its becoming so hardened and dry as to be snapped between the fingers, and to be capable of being reduced to powder. The description of it is not exaggerated when it is said to "look as if it had been baked in an oven." On the other hand, it can as readily be imagined that, either debilitated by inflammatory action peculiar to itself, or sympathising with, and sharing in the debility of other parts, the leaves may have lost the power of acting on the food contained between them, and which supported by the irregularities of the cuticular coat, and imprisoned there in a somewhat pultaceous form, will gradually become putrid and offensive.

A third case may not unfrequently happen. The animal may be fed on too dry and fibrous matter, or he may lazily and but half perform the process of rumination; in consequence of this the hard parts of the food may accumulate in the manyplus more rapidly than they can be ground down, and so the stomach may become clogged and its function suspended. Whatever may be the cause, this state of contraction or inaction of the manyplus often occurs, and either aggravates the pre-existing malady, or becomes a new source of disease, and hastens or causes the death of the animal.

When this stomach has been spasmodically contracted, or long and forcibly distended, the imprisoned food presents a very curious appearance. There is an indentation of the papillæ on the surface of the detained mass. The impression is as perfect as could be made by any seal. All this force must have produced inflammation of the part; and that intense inflammation does occasionally exist in the manyplus, sufficient to produce great and general derangement and even to destroy the beast, is rendered sufficiently evident by the easy separation of the cuticular coat. In many cases, or perhaps in the majority of them, it is impossible to remove the detained mass from its situation without a portion of the cuticular coat accompanying and covering it. It must, however, be confessed, that even this hardened state of the contents of the manyplus is not always a proof of general disease. It is an unnatural and morbid state of the stomach, but very considerable local disease may exist in this organ, as it is known to do in many other parts, without materially, or in any appreciable degree, interfering with general health and good condition. Tubercles and abscesses in the lungs, and inflammation and almost complete disorganization of the liver, will occasionally be found on examination of the carcase, of the existence of which there was not the slightest suspicion during the life of the animal. So, in this case, the fardel-bag has been found choked with food, and that dry, and black, and roasted, and yet the beast had apparently been in perfect health.

The author of this treatise has seen the loss of function confined to one part only of this stomach. Between some of the leaves, or on one side or curvature of the manyplus, the contents have been green and fluid; in the other portion of it they have been perfectly baked. It is a wise and kind provision of nature that the general health and thriving of the animal shall in various cases be so little impaired by local, although serious, disease. Many a trifling circumstance, nevertheless, may cause this local evil to spread rapidly and widely; and, even without any additional excitement, the mere continuance of such a disease, accompanied by such derangement of function, can scarcely fail of being attended by injurious consequences. A very singular account, however, is recorded of the great length of time during which this hardened matter may be detained between the leaves of the manyplus. A person at Bourbourg had a valuable cow that was fed principally on vetches. A serious epizootic broke out in that neighbourhood, and the cow was removed to a distant and uninfected place, where she remained for six weeks apparently well, and without the possibility of her getting at any vetches; she then became infected by this prevalent malady and died. The third stomach was filled with vetches, dry, hard, and, as it were, roasted. Although there was no apparent illness, it is impossible to determine how far this long-continued and unnatural state of the manyplus had preyed on the strength of her constitution, and prepared her for a fatal attack of the epidemic.*

In the Veterinarian for November, 1829, several cases of "staking" or "bound" are recorded by Mr. Cartwright, which were plainly referrible to this stomach. A drove of Anglesea cattle were on their journey to the London market. They appeared to be in perfect health when they crossed the ferry, and they stopped one night in a field near Bangor. They had not got far from this place when one of them was taken ill, and, being altogether unable to proceed, he was slaughtered. A little farther on two others began to fail; and when they arrived on the borders of Shropshire the disease was spreading rapidly among them. They were dull, moaning; they could scarcely be induced to move, and they remained obstinately standing. Proper measures were resorted to: they were bled and purgative medicine was administered, but four of them presently died. In two of these the manyplus was full—clogged with food—but it was soft; in the third, the greater part of the food was soft, but in the larger curvature it was hard and friable. In the fourth beast the manyplus was quite full and hard, each layer being so dried that it would snap short off; and upon each layer there was a thin pellicle or secretion of a blueish colour that could be easily separated; the leaves of the stomach were of a light pinkish hue, and the vessels were injected. Four others, that had been taken ill in the same way, recovered; but it was eight or nine days before any medicine operated, although great quantities were administered. In the third stomach of each there were a great number of small seeds from some unknown plant, said to have grown in this field at Bangor, and which had remained in the stomach from that night.

A more satisfactory proof of the serious nature of the maladies of this stomach is recorded.†

Towards the end of September, 1746, a great number of cows died at Osterwich, in the principality of Halberstadt. Lieberkuhn, a celebrated physician, (there were not any veterinary surgeons at that time,) was sent to examine into the nature of the disease, which was supposed to be one of the species of murrain that was then committing such ravages among the cattle in various parts of the continent. There were none of the tumours, or pestilential buboes, that in an earlier or later period of the malady usually accompanied and characterised murrain, but, on inspection of the dead bodies, considerable peritoneal inflammation was found; the first and second stomachs were filled with food, but the third stomach was the palpable seat of disease—its leaves were black and gangrened. The mass contained between the leaves was black, dry, and so hard that it could scarcely be cut with a scalpel. It intercepted the passage of the food from the two first stomachs to the fourth; and this latter stomach was empty and much inflamed. Neither the heart nor the lungs nor intestines exhibited any trace of disease. Twelve cows were opened, and the appearances were nearly the same in all of them.*

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* Moyens Curatifs, par Vicq-d'Azir, p. 481.

† Disputations de Haller. Tom. v.—Journal Pratique, 1286, p. 38.

M. Lieberkuhn thus accounted for the disease: the pasture had been overflowed in the preceding month, and when the water subsided, vegetation was much quickened by the united influence of moisture and heat, and the numerous poisonous plants with which that locality abounded (different species of dropwort, clematis, and ranunculus growing rapidly, and succulent with the rest) not possessing the natural odour or taste of the mature plant, the beasts, like those in the island of Tornea, fed on them unconsciously, and the poisonous principle which they contained was evidenced in the paralysis or over-excitation of the muscles of the manyplus.

This state of the manyplus is one of the most serious species of indigestion to which these animals are subject, and deserves the attentive consideration of the practitioner. There are, nevertheless, many difficulties accompanying the study of this important subject, and which chiefly arise from the present wretched state of the knowledge of cattle-medicine. The symptoms by which primary or dangerous disease of the manyplus may be distinguished from that of the other stomachs, and the manner in which it can be successfully treated—these are points on which no author has written, nor has any veterinary teacher on the south side of the Tweed instructed his pupils with regard to them. There is no clue, no light, to guide the bewildered practitioner on his way. Is it not disgraceful, that when the veterinary art has professedly been studied in England more than forty years, no effective school of cattle-medicine has yet been established; but oxen and sheep, the most valuable of the live-stock of the agriculturist, continue to be abandoned to the ravages of the various diseases to which they are exposed? It is high time for the different farming societies and for government to interfere, and to protect the most important interests of the agriculturist, and the most effectual source of national prosperity and wealth.

The *clue*, or *fardel-bound*, names by which the retention of the food in the manifolds is distinguished, may be occasionally produced by the animal feeding on too stimulating plants, or on those which are of a narcotic nature. A sudden change from green and succulent food to that which is hard and fibrous may also readily be supposed to be a very likely cause of it. The strange fancy that induces many cows, and especially those in calf, to refuse the soft and nutritious food of the pasture and browse on the coarse grass and weeds which the hedges produce, will necessarily overload the manyplus with hard and fibrous substances; and many a beast has suffered in this way from being too rapidly and exclusively put on chaff of various kinds.

The symptoms vary in different animals, but the following is an outline of them: the animal is evidently oppressed; the pulse is somewhat accelerated and hard; the respiration not so much quickened; the muzzle is dry; the mouth hot; the tongue protruded, and seemingly enlarged; the membrane both of the eyes and nose is injected; the eye is protruded or weeping; the head is extended; the animal is unwilling to move; and the gait is uncertain and staggering; the urine is generally voided with difficulty, and is sometimes red and even black. There is apparent and obstinate costiveness, yet small quantities of liquid fæces are discharged. As the disease proceeds, and often at an early period, there is evident determination of blood to the head, evinced not only by this staggering gait, but by a degree of unconsciousness; the eyes weep more; the lids are swollen; the costiveness continues or some hardened excrement is voided, but fœtid and mixed with blood; rumination ceases; the secretion of milk is usually suspended, or the milk becomes offensive both in taste and smell; the urine flows more abundantly, but that too continues of a dark colour.

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* The reporter adds, (exhibiting the wretched state of veterinary science, and how far the most scientific men were deluded by the absurd notions of the cow-keeper of that period,) 'we examined and divided the tail in various parts, and found it in its natural state.'

Many of these symptoms distinguish this complaint from distention of the rumen; there is not the hardness at the flanks, and the general swelling of the belly, which is observed in distension by food; nor the greater distension and threatened suffocation which accompany hoove. In bad cases, and when the symptoms take on much of the character of that undescribed, and unintelligible disease, wood-evil, tremblings of the frame generally, a degree of palsy, coldness of the extremities, actual swelling of the tongue, the eyes glaring, and the ears and the tail being in frequent and convulsive motion—these are the precursors of death.

The period of the termination of the disease is uncertain; it extends from three or four days to more than as many weeks. Many of these symptoms so often accompany other diseases that they are utterly insufficient always or generally, to lead to a right conclusion as to the nature of the complaint, and careful inquiry must be made into the history of the case.

The treatment is as unsatisfactory as the history of the symptoms. It will always be proper to bleed in order to diminish any existing fever, or to prevent the occurrence of that which continued disease of this important stomach would be likely to produce. To this should follow a dose of physic, in order to evacuate the intestines beyond the place of obstruction, and, by its action on them, possibly recall this viscus also to the discharge of its healthy function. The Epsom salts, with half the usual quantity of ginger, will form the best purgative; and it should be administered either by means of a small horn, or the pipe of the stomach-pump introduced half way down the gullet, and the liquid very slowly pumped in. By this cautious method of proceeding the pillars of the œsophagean canal will probably not be forced open, and the liquid will flow on through the passage still partially open at the bottom of the manyplus, and thence into the abomasum. Of the sympathetic influence which the establishment of increased action of the intestines has on the stomachs above in rousing them to their wonted function, mention has already been made: it is a fact of much importance, and should never be forgotten by the practitioner.

A consideration of the nature of the disease will necessarily lead to the next step. Either a great quantity of food is retained between the leaves of the manyplus in a natural and softened state, or it is powerfully compressed there, and has become dry and hard. Now the longer leaves of this stomach reach from the roof almost or quite to the base of it, and some of them float in the continuation of the œsophagean canal through which all fluids pass in their way to the fourth stomach. Then plenty of fluid should be made to flow through this canal; and this may readily be effected by the small horn, or much better by the stomach-pump. An almost constant current of warm water may thus be kept up through the canal, by means of which the food retained towards the lower edge of the leaves, and most obstinately retained there on account of the hook-like form of the papillæ, will be gradually softened and washed out. This will leave room for the descent of more; and the natural action of this portion of the leaves being possibly re-established, when freed from the weight and oppression of that by which they had been filled, the mass that remains above will begin to be loosened; it will gradually descend and be softened by the stream, and it too will be carried off; and so, in process of time, a great part of the stomach will be emptied, and the manifolds will be so far relieved as to be able to renew its natural function.

The use of oil has been recommended for this purpose, but the hardened food will be more readily softened by warm water, than by any oleaginous fluid that can be administered. Some portion of aperient salt should be dissolved in the water, in order that purgation may be established as soon as possible, or kept moderately up when it is established; but no heating, stimulating, tonic medicine, beyond the prescribed proportion of aromatic to the purgative, should on any account be given, for it is impossible to tell what inflammatory action may be going forward in the manyplus, or to what degree the spasmodic contraction on its contents may be increased. No food should be allowed except soft or almost fluid mashes, but the animal may be indulged in water or thin gruel without limit. Clysters can have little effect, and will only uselessly tease the animal already sufficiently annoyed by frequent drenching.

After all, it may be doubtful whether the injury and danger produced by the distention of the manifolds with food is not sometimes brought about in a different way from that which has been hitherto imagined. This stomach has already been described (p. 425,) as situated obliquely between the liver and the right sac of the rumen, and, therefore, when distended by food it will press upon the liver, and impede the circulation through the main vessel that returns the blood from the intestines to the heart, and thus cause the retention of an undue quantity of blood in the veins of the abdomen. From this will naturally or almost necessarily arise a determination of blood to the brain, and the winding up of the disease by a species of apoplexy. This, however, will not alter the opinion that has been given of the proper treatment of the disease; but will throw considerable light on the nature and causes of some of these determinations to the head, which have not hitherto been perfectly understood.

MALFORMATION OF THE MANYPLUS.

A singular construction of the manifolds is related by Mr. Harrison, and from which some useful hints may be derived.* He says that "two cows were observed, during the whole of their lives, to eat a more than ordinary quantity of food; so much so, as at some times to double, and even treble, that which was consumed by ordinary cattle. They did not, however, repay this great consumption by a better appearance or more plentiful supply of milk; on the contrary, their milk was rather smaller in quantity, and of an inferior quality compared with ordinary cows; and the fattening of them was attended with great cost and trouble, and took much longer than the usual time.

I for a long time narrowly watched them, unable to give any satisfactory reason for their great voracity, and frequently thinking that if bulimia (unnatural appetite) was ever known to exist in the brute creation, it was here presented to my view, for food of every description, except animal, was devoured by them with wonderful rapidity. The cause of this remained unknown and unsuspected until they were slaughtered, when, to me, a most important point in the physiology of digestion in ruminants stood clearly developed; for, upon examining into the structure of their manifolds, the internal surface of one of them merely displayed rugæ not quite so long as my finger, and in the other the corrugations were even less strongly marked.

The fact, then, was plainly demonstrated, that the food in these two cases, owing to the mal-formation of the manifolds, was not retained that length of time which was necessary for the breaking or macerating of it into a pulp, for the complete action of the abomasum and intestines; and that in its passage through the latter, as much chyle could not be separated from an equal quantity of food, as would have been, had not nature played this freak; and that from this cause they were obliged to take in a larger quantity, or in other words, to eat more frequently, than ordinary cattle, in order to produce the required quantity of nutriment for their due support, and the healthy performance of the various secretions."

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* Veterinarian, 1833, p. 584.

THE DISEASES OF THE ABOMASUM OR FOURTH STOMACH.

Our knowledge of the nature, and symptoms, and treatment of these diseases is as imperfect as of those of the manyplus. Concretions, and mostly of hair, are occasionally found in this stomach, which, by their pressure, must produce disease to a certain extent. Poisonous substances, received into this stomach after rumination, as is sometimes the case when the plants are fully grown, from the deficiency of acute taste in the ox, and which oftener happens when, in spring, neither their taste nor their smell is developed, produce inflammation and ulceration of the coats of the abomasum. Inflammation may and does exist from other causes, as exposure to too great heat, and the continuance of unseasonable cold and wet weather, too sudden change of food, the administration of acrid and stimulating medicines: but the practitioner can rarely distinguish them from inflammatory disease of the other stomachs, or of the intestinal canal.

So far as the catalogue of symptoms can be arranged, they are nearly the following: there is fever; a full and hard pulse at the commencement, but rapidly changing its character and becoming small, very irregular, intermittent, and, at last, scarcely to be felt except at the heart. The beast is much depressed and almost always lying down, with its head turned towards its side, and its muzzle, as nearly as possible, resting on the place beneath which the fourth stomach would be found, or when standing, it is curiously stretching out its fore limbs, with its brisket almost to the ground. The inspirations are deep, interrupted by sighing, moaning, grinding of the teeth, and occasionally by hiccup; the tongue is dry and furred, and red around its edges and at the tip; the belly generally is swelled, more so than in distention of the rumen by food, but less so than in hoove, and, as further distinguishing the case from both, it is exceedingly tender; there is frequently distressing tenesmus, and the urine is voided with difficulty and drop by drop. After death, the stomach exhibits much inflammation of the lining membrane, but very seldom any ulceration.

The remedies would be bleeding, purgatives, mashes, and gruel.*

It is almost useless to dwell longer on this unsatisfactory portion of the subject, except to warn the practitioner against being misled by the peculiar softness of the inner lining membrane of the fourth stomach of the ox. That which would be said to be diseased condition, or softening, or even decomposition of the inner coat of the stomach in other animals, is the natural state of the abomasum in cattle.

VOMITING.

A case was related, in page 436, of the treatment of a cow that had gorged herself by eating wheat chaff. Water was injected into the rumen, until that stomach began to react upon its contents, and a considerable proportion of them was discharged by vomit. M. Girard mentions a case in which the contents of the rumen were thrown off without this injection of water. He was sent for to some cows that had been feeding on young lucern, and that were beginning to swell. He found one in the act of dying; two others were prodigiously swelled—they breathed with difficulty, and seemed to be in danger of immediate suffocation; others were much inconvenienced by the distension of the paunch. He hastened to puncture the flank of one of those that appeared to be in extreme danger; and, while he was thus employed, the other, after some convulsive efforts, vomited two pailsful of unmasticated food. Her flanks immediately subsided, and in the course of a very little while she seemed to have perfectly recovered.*

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* Some of the foreign remedies for this malady are stranger and more absurd than those which disgrace the practice of the most ignorant empirics in the British islands. A pound of shot is first administered, and this succeeded, or perhaps superseded by a drug of a very different kind: a black pullet is roasted with all its feathers upon it; it is then pulled to pieces, boned, and crammed down the throat of the animal. Toggia, Malattie de Bovei, tom. i. p. 63.

The knowledge of these facts, of the occasional occurrence of which few practitioners can be ignorant, will point out a mode of proceeding that promises the happiest result when the stomach is distended by food. This is not, however, strictly speaking, the act of vomiting; it is only an extension of the process of returning the food to the mouth for the purpose of rumination, or it is the whole returned suddenly and in a mass, instead of pellet after pellet. True, vomiting is the return of food from the fourth or digesting stomach, that which alone may be considered a veritable stomach, in distinction from the mere preparatory functions discharged by the others. Respecting this, it has been stated in page 428, that it is comparatively a rare process, and attended with extreme danger. The slightest reconsideration of the structure and connexion of that portion of the digestive apparatus which has been described, will render it evident that every thing is disposed to facilitate the return of the food from the rumen to the mouth, but to render that return difficult from the fourth stomach. First, there is the fold of that stomach placed at the entrance into it from the manyplus. It is delineated at *g* and *h*, page 424. It evidently leaves a free and open way to the substances that pass from the third stomach into the fourth, but presents an almost perfect valvular obstruction to their return. Supposing that could be surmounted, it is evident that when the fourth stomach, pressed upon by the abdominal muscles and the diaphragm, contracted, the other stomachs would contract too, and especially the manyplus; and, in that contraction, the aperture between it and the œsophagean canal would be firmly closed: or even, if that were not the case, there is only a small circular aperture between the œsophagean canal and the fourth stomach, through which the returned semifluid mass would pass very slowly, and not in the quantity in which it would be ejected from the abomasum in the effort to vomit.

M. Fleurens put this to the test. He injected a solution of emetic tartar into the veins. This was followed by the greatest distress, and violent efforts to vomit, but not a particle of the remasticated food was returned. He injected more into the manyplus, whence it passed into the abomasum. The efforts to vomit were here also violent, but fruitless.†

There is, however, a case of true vomiting, so singular as to deserve to be put upon record. An ox presented the following appearances: the hair rough; the skin dry and adherent; the muzzle dry; the appetite diminished; rumination slow and seldom; and slight tension of the left flank. Having heard that the animal occasionally vomited, the practitioner determined to remain a while in the stable in order to satisfy himself of the accuracy of the account. In about an hour rumination commenced preceded by deep and sonorous eructations having a penetrating odour. This lasted about ten minutes; after which the animal got up, backed himself in his stall; hung on the chain; his fore limbs trembled; he brought his hind extremities as much as possible under him, and bent his neck, and depressed his head, and after a deep and powerful inspiration, he vomited 15 pounds of semifluid matter, perfectly triturated. The vomiting ceased, the ox remained for a moment motionless, and then lay down again, and ruminated afresh. He continued this about thirty-five minutes, when he had a renewed fit of vomiting perfectly similar to the preceding.

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* Memoire sur le Vormissement, par J. Girard, p. 24.

† Recueil Méd. Vét. Aout, 1833.

This was the only one of the herd that vomited, but the others were constipated, and hide bound, and in every way out of condition. The cause of this was supposed to be that the animals were driven nearly a league twice every day in order to be watered, at a time when the heat was excessive. They were ordered to be oftener watered, and that at home; and the one that vomited was bled, physic was administered, and the sickness almost immediately ceased.*

It is impossible to doubt the accuracy of this account, or that it was a case of true vomiting. The matter discharged was semifluid, and well triturated, and, consequently, could neither come from the rumen nor the manyplus. The same author, M. Creuzel, relates other instances of what he terms vomiting, but evidently ejection of the contents of the rumen: all of them were connected with hoove, and in every case the animal experienced immediate and perfect relief.

CHAPTER XIII.

THE ANATOMY AND DISEASES OF THE SPLEEN, LIVER AND PANCREAS.

THE SPLEEN.

The *Spleen*, or *Melt*, is a long, thin, dark-coloured substance, situated on the left side, attached to the rumen, and between that stomach and the diaphragm. It is longer, and yet narrower and smaller in cattle than in the horse, and is more closely tied to the stomach by blood-vessels, and cellular texture. In the horse, it is thick at one end, and tapers towards the other; in cattle, it is of a uniform size through its whole extent, except that it is rounded at both ends. Of its use we are, in a manner, ignorant; and it has been removed without any apparent injury to digestion. Its artery is large and tortuous, and its vein is of great size, and forms a considerable portion of that which conveys the blood from the other contents of the abdomen to the liver. It is probably connected either with the functions of the liver, or with the supply of some principle essential to the blood.

It is subject to various diseases, inflammation, ulceration, increased size, tubercles, hydatids, ossification; but in the present state of cattle medicine it is impossible to state the symptoms by which the greater part of these are characterised.

In sheep, inflammation of the spleen, and hæmorrhage from it, or exudation of blood through its coats, is not an uncommon disease. In those that die of inflammatory fever, with which a high degree of intestinal inflammation is connected, or that perish in consequence of inflammation of the peritoneum or investing membrane of the bowels, it is not unusual to find an effusion of a deep blood-coloured fluid in the abdomen. This has been almost uniformly attributed to one or the other of these diseases, in proportion as they have been observed to prevail; but the occasional seat of disease, the spleen, and which is found most especially to have suffered, is too frequently overlooked. So it is in cattle. A beast in high condition, over-driven, or placed in too luxuriant pasture, is suddenly taken ill: he staggers; his respiration becomes laborious; his mouth is covered with foam; he stands with his head stretched out, labouring for breath; he moans; blood escapes from the nostrils or the anus; the disease runs its course in the space of a few hours, and the animal staggers and dies. On opening him, the vessels beneath the skin are all gorged with blood; the skin itself is injected and red; the lungs and abdominal viscera are congested with blood; the liver is gorged with it. It is inflammatory fever that has destroyed the animal; but the spleen is most of all affected and disorganised—it is augmented in size, softened, its peritoneal covering torn, and blood has rushed from it and filled the belly; or the blood has oozed through the investment without any visible rupture.

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* Journal Pratique, 1830, p. 322.

In such a malady, the skill of the practitioner can be of little avail. Had the peculiar determination of disease to the spleen been discovered, it could not have been arrested; and all that can be obtained is a lesson of wisdom, a caution to adopt a more equable and less forcing system of feeding, and the avoidance of all those causes of general inflammation in which the weakest organ suffers most, and by its disorganization, causes, or, at all events, hastens death. M. Dupuy, professor of the veterinary school at Toulouse, records a case of hæmorrhage from the spleen, but not attended by so much general inflammation as is usually found. He says, that on the 21st of March, 1831, a beast, eighteen or twenty hours after it died, was brought to the school to be examined as to the cause of death. It had a cough for several months; but the disease that had probably destroyed it, had come on all at once, and had run its course in a few hours. The belly contained 2½ gallons of blood, but the intestinal canal was perfectly sound. All the vessels of the abdomen were carefully examined, in order to discover the source of hæmorrhage, but no rupture was found. The liver was double its natural size, soft, friable and of a gray colour. The spleen three times as large as it is found to be in a state of health. The peritoneal covering was detached from the substance of the spleen, and the cavity thus made was filled by a clot of blood three or four lines in thickness; and towards the middle of the inferior border was a laceration four or five inches in length, whence the blood had flowed. The substance of the spleen was reduced to a semifluid form, and was of a livid red colour. The pericardium contained half a pound of bloody serosity.*

THE LIVER.

This organ is situated on the right side of the abdomen, between the manyplus and the diaphragm. It is principally supported by a duplicature of the peritoneum extending from the spine; and is confined in its situation by other ligaments, or similar peritoneal duplicature connecting its separate lobes or divisions with the diaphragm. It is divided into two lobes of unequal size. The right lobe is larger than that in the liver of the horse; the smaller one is comparatively diminutive; and, altogether, the liver of the ox is less than that of the horse.

It has just been stated that the blood from the other contents of the abdomen, instead of flowing directly to the heart, passes through the liver. It enters by two large vessels, and is spread through every part of the liver by means of the almost innumerable branches into which these vessels divide. As it passes through the liver, a fluid is secreted from it, called the

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* Journ. Prat. de Méd. Vét., Mai 1831, p. 161.

bile, probably a kind of excrement, the continuance of which in the blood would be injurious, but which, at the same time, answers a peculiar purpose in the process of digestion, that will be presently described.

The bile thus secreted flows into the intestines, and enters the duodenum through an orifice, the situation of which is marked out by *h*, p. 426. In the horse, it flows into the intestines as fast as it is secreted or separated from the blood; but in cattle, a portion of it, probably a comparatively small portion, is received into a reservoir, the *gall-bladder*, where it is retained until needed for the purpose of digestion. While the ox is grazing or asleep, there is no necessity for the whole of the bile to run on into the intestines, but a part of it accumulates in the gall-bladder. While it is retained there, it undergoes some change; part of the water which it contains is absorbed, and the residue becomes thickened, and more effective in its operation; and when the animal begins to ruminate, and portions of food pass through the fourth and true stomach into the duodenum, not only is the flow of bile into the gall-bladder stopped, but, either by some mechanical pressure on that vessel which no one has yet explained, or, more probably, by the sympathy which exists among all the organs of digestion, and the influence of the great organic nerve causing the (probably) muscular coat of the vessel to contract, the bile flows out of its reservoir, and proceeds to its ultimate destination, along with the portion which continues to run directly from the liver into the intestine, through the medium of the hepatic duct, This pear-shaped reservoir, the gall-bladder, is placed in a depression in the posterior face of the liver, and adheres to it by means of a delicate cellular texture. The construction of this vessel deserves attention. It has the same external peritoneal coat with the viscera generally; beneath is a thicker coat, evidently composed of cellular substance, in which no muscular fibres have yet been demonstratively traced, but in which they may be well conceived to exist, and in which, doubtless, they do exist, in order to enable the gall-bladder to contract and expel its contents. The inner coat is a very singular one. It has not precisely the honeycomb cells of the reticulum in miniature, but it is divided into numerous cells of very irregular and different shapes, in the base of which, as in the cells of the reticulum, are minute follicular glands that secrete a mucous fluid to defend the internal surface of the gall-bladder from the acrimony of the bile which it contains.

INFLAMMATION OF THE LIVER.

Cattle, and especially those that are stall-fed, are far more subject than the horse to inflammation of the liver. This appears evidently enough on examination after death, but the symptoms during life are exceedingly obscure, and not to be depended upon. An almost invariable one, however, is yellowness of the eyes and skin; but this accompanies, or is the chief characteristic of obstruction of the biliary duct, and possibly exists without the slightest inflammation of the substance of the liver. It should also be remembered that there is scarcely any acute disease to which cattle are subject in which the liver does not sympathise.

We shall have reason to suppose, by-and-by, that the bile performs an important part in the process of digestion. It is secreted in great abundance in a healthy state of the animal, and that secretion is very much increased under almost every intestinal disease, on account of the sympathy which exists between the liver and the other organs of digestion. The feeding too much on oil-cake will produce in most cattle a yellowness of the skin during life, and a yellow tinge of the fat and the envelopes of the muscles after death.

In addition to the common symptoms of fever, (quickness of the pulse, heaving, dryness of the muzzle, heat of the mouth and root of the horn, listless or suspended rumination,) those that would lead to the suspicion of inflammation of the liver would be, lying continually on the right side, slight spasms on that side, or wavy motions of the skin over the region of the liver—a general fulness of the belly, but most referrible to the right side, and the expression of considerable pain when pressure is made on that side. Occasionally, the animal looks round on this part, and endeavours to rest his muzzle upon it. There is usually some degree of constipation; the beast does not urine so often or so abundantly as in health, and the urine is yellow or brown, or, in a few cases, bloody.

The proper remedies are bleeding, physic, blisters on the right side, and restricted diet, from which every thing of a stimulating kind is carefully withdrawn. The most frequent causes of this complaint are blows, overdriving, the use of too stimulating food, and the sudden repulsion of some cutaneous disease.

Inflammation of the liver sometimes takes on a *chronic* form. Perhaps it never assumed any great degree of intensity, or the intense inflammation was palliated, but not removed; and this state may exist for some months, or years, not characterised by any decided symptom, and but little interfering with health. Then commences induration, or hardening of a portion of the liver, or of the greater part of it, and accompanied by tubercles, vomicæ, hydatids, and the existence of the fluke-worm in the ducts.

A cow came up from the west to Smithfield market, in the year 1832. She was in tolerable condition, yet not in such a state as to afford a chance of her being bought by any respectable butcher; she was, therefore, set apart for the sausage-makers, and to them she was sold. She walked pretty well with the other cattle, and had no indication of disease, except enlargement of the belly, yellowness of the skin, and her not carrying so much flesh as the rest. On examination after death, the liver weighed no less than 137lbs., and measured, from one lobe to another, more than a yard and a quarter. There was little of the common appearance of inflammation but it was evident that there were numerous hydatids: in fact, they occupied the larger part of the organ, and had hollowed it into various cavities of greater or smaller size. One cavity, nearly thirty inches in circumference, presented when opened the appearance of a honeycomb, all the cells of which, and the whole of the excavation, were filled with hydatids, from the size of a sparrow's egg to that of a swan: there were nearly 300 of them. Some cysts were filled with blood, and others with matter of a fibrous character, and others had large fibrous cords extending from side to side. A few portions presented nearly the character of healthy liver, but, in general, where there were no hydatids, the substance resembled a deposit of matter that had gradually hardened into cartilaginous cells, and the centre of the liver was perfectly fibro-cartilaginous, without any trace of its original structure. This disease had probably existed during a long period, and had only interfered with health by preventing her attaining the usual condition of fatted cattle.

Mr. Goodworth, of Howden, relates another case of the existence of disease of the liver, apparently for a considerable period, and not interfering with health. He says, that 'a cow, the property of a neighbour, had calved, and done well. She was milked twice a day, and appeared in good health for six weeks, when the maid going to milk her in the morning found her very uneasy, and evidently ill. The cow was bled, and a messenger was sent to a druggist for medicine; but although he was absent only a few minutes, the cow was dead on his return. On opening the body, all the abdominal viscera were found in perfect health, except the liver, the right lobe of which was much enlarged; and on an incision being made into it, a quart of matter of the consistence and colour of cream escaped.'*

The difficulty of detecting this chronic inflammation during the life of the animal throws much obscurity on the mode of treating it. Permanent yellowness of the skin—a constant, but not violent cough—and the want of, or the slowness in acquiring, condition beyond a certain degree, would be the symptoms of most frequent occurrence. The treatment should consist of the frequent exhibition of gentle purgatives, with a more than the usual quantity of the aromatic (six ounces of Epsom salts, and half an ounce of ginger,) and the food should be green, succulent, and as little stimulating as possible. Mercury, to which recourse is usually had, when a similar complaint is suspected to exist in the human subject, would be worse than thrown away upon cattle. In the majority of cases in which it is used for the diseases of cattle, it produces decided injurious effect.

HÆMORRHAGE FROM THE LIVER.

It has already been observed that when these animals are turned on the fresh grass in the spring, or the fog in autumn, they are subject to various plethoric or inflammatory complaints. The ravages of apoplexy and inflammatory fever at these times have been described. An undue quantity of blood rapidly formed oppresses the whole system, and, from some cause of determination to it, a particular organ or part becomes violently congested or inflamed, and the animal is destroyed. The liver occasionally suffers in this way.

A case will illustrate this. It occurred in the practice of Mr. Tait, of Portsoy. He was requested to see a heifer, two years old, that on the previous night had been observed to be unwell. The pulse was 80, nearly imperceptible at the jaw; the extremities were cold, and rumination was suspended. There was much trembling of the hind quarters. An attempt was made to bleed her, but ere the blood could flow, she fell and expired. On opening the belly, the cavity was found to contain nearly six gallons of blood, which had escaped from a rupture, two inches in length, in one of the lobes of the liver.†

It would have been more satisfactory if fuller particulars of the previous symptoms of the disease and of the appearance of the other viscera had been given, but the experience of almost every practitioner will supply the deficiency. Certain beasts have died of some obscure disease; it has been rapid in its progress, and not characterized by any symptoms of great inflammation, or the inflammatory symptoms, if such had appeared, have subsided, and those of evident and extreme exhaustion have succeeded. The pulse has been feeble, or almost indistinct—the mouth has been cold—the membranes of the mouth and nose pale. The breathing has been accelerated, and the weakness extreme. After the death, substance of the liver has been found softened; it has broken on the slightest handling; it may be washed away, and the various vessels which permeate it exposed: the peritoneal covering has been loosened—elevated from the liver—and the interval has been occupied by a clot of blood; and from some rupture in this covering, which has partaken of the softening of the viscus itself, a quantity of blood has been poured out; or it has oozed through the covering, and partially or almost entirely filled the cavity of the abdomen.

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* The 'Veterinarian,' June, 1831, p. 307.

† Ibid. March, 1834, p. 147.

In such a case, the resources of medical art would be powerless. but every instance of hæmorrhage from the liver should be regarded as a warning against the adoption of too forcing a system of fattening, especially in young beasts, and in the spring or fall of the year.

JAUNDICE, OR THE YELLOWS.

There are few diseases to which cattle are so frequently subject, or which are so difficult to treat, as *jaundice*, commonly known by the appropriate name of *the yellows.* It is characterized by a yellow colour of the eyes, the skin generally, and the urine. Its appearance is sometimes sudden, at other times the yellow tint gradually appears and deepens. In some cases it seems to be attended, for a while, by little pain or inconvenience, or impairment of condition; in others, its commencement is announced by an evident state of general irritation and fever, and particularly by quickness and hardness of pulse, heaving of the flanks, excessive thirst, and the suspension of rumination; to these rapidly succeed depression of spirits, and loss of appetite, strength, and condition. The animals can scarcely be induced to move, or they separate themselves from the herd, and retiring to the hedge, either slowly pace along the side of it, or stand hour after hour, listless and half unconscious. Not only the skin, but the very hair, gradually becomes yellow; a scaly eruption appears attended by extreme itching, and sometimes degenerating into the worst species of mange. It is seldom, indeed, that bad mange appears among cattle without being accompanied by a yellow skin; and the cutaneous eruption was probably caused by the presence and constant excretion of bile irritating the exhalent vessels of the skin. A state of costiveness usually accompanies the yellow skin, at least in the early period of the disease, although diarrhœa, which no astringents will subdue, may afterwards appear, and, in fact, will generally wind up the affair, and carry the patient off. Jaundice cannot long exist without being accompanied by general impairment of health, and loss of condition. Cows are particularly subject to it in spring and autumn. The milk soon shares in the yellowness of the other secretions, and occasionally acquires an unpleasant and bitter taste.

The usual cause of jaundice is obstruction of the passage of the bile from the gall-bladder into the duodenum. This obstruction is effected in various ways; but most frequently by biliary concretions or calculi. During the continuance of the bile in the gall-bladder, a certain portion of the water which it contains is removed by the process of absorption; the residue becomes proportionably thickened, and the most solid parts are either precipitated, or form themselves into hard masses. Biliary calculi are not unfrequently found in the gall-bladder of cattle, of varying size, from that of a pin's head to a large walnut. Their form indicates that they were composed by some process of crystallization; they are round with concentric circles, or conical, or assuming in a rude way the form of a cube, or a pentagon, or hexagon. There is usually some central portion of harder bile round which the rest is collected. They are of less specific gravity than the bile, and even than water, and are found swimming in the gall-bladder. They are composed of the yellow matter of the bile, with a portion of mucus holding it together; and this colouring matter is valued by the painter on account of its peculiar and almost unrivalled permanence. It is insoluble in water and alcohol, but it readily diffuses itself in a solution of potash.

So far as can be observed, the presence of these calculi in the gall-bladder does not inconvenience the animal, or interfere with health, for they are found in the greater number of oxen that are brought to the metropolitan slaughter-houses. At all events, there are no recognized symptoms by which their presence can be detected, or even suspected. In some cases the writer of this work has detected more than a hundred small calculi in the bladder of one ox.*

Sometimes, however, they enter the duct (the cystic) which conveys the bile to the intestines. They are likely to do this on account of their swimming on the surface of the fluid which the bladder contains. The cystic duct is large at its union with the bladder; it is a continuation of the neck of the bladder; and the gall-stone may be easily pressed into the commencement of the tube: but it has scarcely entered it before its passage is obstructed by the folds of the inner coat of the duct. These assume a semilunar form, with the edges projecting towards the bladder, and they act as partial valves, retarding the progress of the bile, so that it may not be all pressed out at once, but gradually escape as the process of digestion may require.

The gall-stone being thus impacted, violent spasmodic action takes place in the muscles of the duct, occasioned by the irritation of its continued pressure. It is fortunate, however, that although the muscles of these ducts act with some power, the obstruction is usually, with no great difficulty, overcome. The duct distends; as it distends, these valvular folds lie closer to the sides, and no longer oppose the passage of the calculus, which is pressed on until it reaches the common duct. The calibre of this tube is larger, and, unless the calculus is of considerable bulk, no farther difficulty occurs until it reaches the opening into the duodenum, which being situated in the centre of a muscular prominence, acting as a valve, and preventing the passage of all matters whether fluid or solid from the intestine into the ducts, a new difficulty is opposed to the progress of the gall-stones, and there is some return of pain, and in a few cases the pain is evidently more intense than in the early stage. At length this sphincter muscle of the duodenum dilates; the calculus enters the intestinal canal; the pain ceases, and the natural colour of the skin returns. In this species of jaundice, we have, in addition to the yellow skin, the heaving of the flanks, the hard concentrated pulse, the diminished appetite, the insatiable thirst and the other symptoms of fever. Then, too, we have the alternate coldness and heat of the ears, the roughness of the coat, the urine becoming first of a transparent yellow, and then opaque red, saffron-coloured, or brown, and the sediment brown. The bowels are constipated, the fæces seldom evacuated, and, when appearing, are hard and black.

Bleeding is now clearly indicated, and that until the animal becomes faint. During this partial sympathy, the muscles of the duct may cease their spasmodic constriction, and the calculus may pass on. To this should be added powerful purgation, consisting of doses of a pound and a half each of Epsom salts, or of a pound of the salts, with 10 grains of the Croton Tiglii; the medicine being repeated once in six hours, until purging is produced. Mashes should be given to hasten and increase the action of the physic, and the beast should, if possible, be turned out to grass during the day, and taken up at night. Opium or digitalis, and particularly the latter, may be given, in doses of half a drachm of either, with a view to allay the violent constriction of the duct. From the knowledge that biliary concretions dissolve in a solution of potash, considerable quantities of nitrate and acetate of potash have been given, but with doubtful success. Ether, hydrochlorate of ammonia, potash, and soda, have also been fruitlessly administered for the same purpose.

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* 'The number of calculi sometimes contained in the gall-bladder is almost incredible. Morgagni took 3646 out of this reservoir belonging to a human being; and in the Hunterian Museum at Glasgow, 1000 are preserved, which are stated to have been extracted from one gall-bladder.'—*Cyclopædia of Practical Medicine*, article Jaundice.

Another mechanical cause of jaundice may be the obstruction formed by the *fasciola* or *fluke-worm*. This singular parasite, resembling in form a little sole, and of the natural history of which, or of the changes that it has undergone, or may undergo, nothing is known, is found in great quantities in the livers of rotted sheep and deer, and, next to them, in the livers of cattle, and especially of those that are bred in low and marshy situations. They accompany almost every chronic disease of the liver, and often exist in the healthy animal. They inhabit the ducts into which the bile is poured from the smaller vessels of the liver—they are swimming in the bile, and said to be generally found working their way against the course of that fluid.

There is no case on record in which it has been proved by examination after death that the fluke-worm has mechanically obstructed the passage of the bile, and thus caused both the yellowness and the spasm, yet it can easily be imagined that this will sometimes occur. There are no peculiar symptoms to indicate the existence of these worms, for they have never been voided from the mouth or the anus:—to the first, there would be a mechanical impediment from the construction of both the lower and upper orifices of the stomach; and the digestive process going on through the whole of the intestinal canal would render the latter improbable, if not impossible. Their presence could only be guessed at from the nature of the pasture, or from their having been found in other beasts of the same herd.

The same means would be adopted as in supposed obstruction by a calculus, but with this probable difference, that the obstruction would be more easily and quickly removed.

Of the other species of jaundice in which the attack is more gradual, and apparently unconnected with pain, and in which the symptoms are weakness, listlessness, œdematous swellings, high-coloured urine, hardened excrement, declining condition, and occasional death, anatomical observation has discovered various causes. The state of the liver itself will sometimes account for every symptom. It may labour under chronic inflammation, without disorganization, and the secretion of bile will be considerably increased, and produced more rapidly than the ducts can carry it off, or than it can be disposed of in the process of digestion, and it would lurk in the intestines, and be taken up by the absorbents and carried into the circulation. At other times the diseased state of the liver prevents the escape of the bile, whether in its natural or even diminished quantity; thus, general enlargement of the substance of the liver will press upon and partially close the biliary ducts—tubercles, or other tumours in the liver will effect the same thing. Inflammation may exist in the ducts themselves. They may become thickened or ulcerated, and thus cease to give passage to the bile, which will then be taken up by the absorbents of the liver, or mechanically forced back upon the vessels whence it was secreted. These are occasional causes of jaundice; and when they exist it will not be wondered at that the complaint is obstinate, and too often fatal.

Sometimes the source of the evil may exist in the duodenum. It may be inflamed or ulcerated, or thickened, and so the opening from the biliary duct into the intestine may be closed: or the mucus which may be secreted in the duodenum may be too abundant, or of too viscid a character, and thus also the orifice may be mechanically obstructed.

What symptom will indicate to the practitioner which of these morbid states of the liver or its ducts, or if the first intestine, is the cause of the disease? of if it did, what means could he adopt in such a case with the hope of ultimate success? The treatment of confirmed jaundice is a thankless and disheartening business. The practitioner, however, must look carefully and anxiously to the symptoms, and be guided by them. There is no general rule to direct him here. If there is evident fever, he must bleed, and regulate his abstraction of blood by the apparent degree of fever. In every case but that of diarrhœa; and at the commencement of that, he must administer purgatives—in large doses when fever is present, or in somewhat smaller quantities, but more frequently repeated, when constipation is observed; and in doses still smaller, but yet sufficient to excite a moderate and yet continued purgative action, when neither fever nor constipation exists. Considering, however, the natural temperament of cattle, the purgative should be accompanied by a more than usual quantity of the aromatic, unless the degree of fever should plainly forbid it. There are few things respecting which veterinary practitioners differ more than the kind of purgative that should be administersd in this case. Some, who are usually partial to the Epsom or Glauber's salts, here prefer the aloes. Mr. Leigh, of Bristol, in a letter with which he favoured the writer of this treatise, says, that 'jaundice is soon checked at the beginning, by administering Barbadoes aloes, Castile soap, and Venice turpentine;'' Mr. Baker, of Reigate, as easily effects a cure by the administration of Epsom or Glauber's salts in doses according to the size of the beast; while the author of 'the Survey of Somersetshire' gives us a remedy for yellows, which seldom or never fails; 'flower of mustard, mixed with any liquid, and in doses of two ounces, repeated two or three times in the course of twenty-four hours.'*

It may not, perhaps, be quite a matter of indifference what purgative is administered. The Epsom salts here, as in other cases, is the safest, the most to be depended upon, and the most effective: but the secret of treating jaundice, not with the almost invariable success of which some speak, but with the best prospect of doing good, is by the repetition of mild purgatives, accompanied, and their power increased, and the digestive powers of the animal roused, and his strength supported by the addition of aromatics and stomachics in such doses as the slight degree, or the absence, of fever may indicate. The writer of this article certainly cannot confirm by his testimony the opinion of the comparative ease with which the complaint may be removed: he has not only found it to be one of the most common affections of the liver, but one of the most untractable and fatal; and this from the insidious manner in which it proceeds until it has fixed itself on the constitution beyond the power of medicine to remove it. The following short directions comprise all that can be done:—subdue the inflammation or fever by bleeding and physick;—keep the bowels afterwards under the mild but evident influence of purgative medicine;—add aromatics and stomachics to the medicine almost from the beginning; to these, if the strength and condition of the animal should appear to be wasting, add tonics—the gentian root will stand at the head of them;—and lastly, when the disease has been apparently subdued, a few tonic drinks will restore the appetite, prepare for the regaining of condition, and re-establish the secretion of milk.

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* Some boil 8oz. of saffron in a quart of milk, and esteem it to be a never-failing cure of jaundice. The drink will certainly be expensive, but what good effect can be produced by the employment of this inert yellow drug for the cure of the yellow disease yet remains to be proved. Every one who is in the slightest degree acquainted with cattle medicine would pronounce such a decoction to be altogether ineffective. It was this superstitious notion of getting rid of one yellow by the application of another, that gradually made the powerless and useless turmeric an indispensable ingredient in cattle medicine, since jaundice is more or less mixed up with the various diseases to which cattle are subject.

The use of saffron, however, is of no recent date in horse as well as cattle practice. The following recipe is extracted from the Harleian MSS. No. 507, as arranged in the library of the British Museum.

'Take three pennyworth of English saffron, two pennyworth of treacle, one pennyworth of sallad oyle, three of sugar candy, two of turmericke, and a quarte of milke. Seethe all this together, and then let it stand until it is cool, and give it to the horse fasting and ride him a little upon it, and set him up warm, but he must be blooded first; and three howers afterwards give him a mash.'

THE PANCREAS.

This is a long, irregularly formed, flattened gland, considerably smaller in cattle than in the horse, and confined in them to the left side of the abdomen, in the neighbourhood of, but not adhering to, the fourth stomach, and mostly connected with the duodenum and colon, by mesenteric attachments. It is of a pale red colour, and evidently composed of an accumulation of small glands resembling salivary ones: each of them is a secreting gland, and a duct proceeds from each;—these unite and form one common canal, which takes its course towards the duodenum, unites itself with the biliary duct, already described, and enters with it into the duodenum, as represented at *h*, in the cut in p. 426. The nature of the fluid thus conveyed will be presently considered.

This gland appears to be subject to very few diseases, and the symptoms of these diseases are, in the present state of knowledge of the pathology of cattle very imperfectly known. In a few instances, enlargement of the pancreas has been found after death; (in one case, this conglomerate gland was more than treble its natural size;) at other times, there have been inflammation, tubercles, a schirrous induration, and considerable abscess; but there were no previous symptoms to lead to the suspicion that this gland was the principal seat of disease, and there were other morbid appearances in the stomachs or intestines, to indicate sufficient cause of death without reference to the state of the pancreas. This is a subject which deserves the attention of the veterinary surgeon, and on which no one has yet ventured to write.*

We are now prepared to follow the passage of the food from the fourth stomach into the intestinal canal.

CHAPTER XIV.

THE ANATOMY AND DISEASES OF THE INTESTINES.

If the reader will refer to the cut of the Intestines of the Horse, in page 202 of the Treatise on that animal in the Farmer's Series, he will perceive a considerable difference in their appearance and structure in the horse and in cattle. There is in cattle comparatively little of the irregularity of size which is seen in the intestines of the horse. The colon and the cæcum, although larger than the small intestines in cattle, are diminutive compared with those viscera in the horse. The reason of this is sufficiently evident. The enormous development of the rumen, occupying nearly three-fourths of the abdominal cavity, leaves no room for an intestine so bulky as the cæcum of the horse: the bowels are therefore diminished in size, in order that they may be more readily packed wherever room can be found for them.

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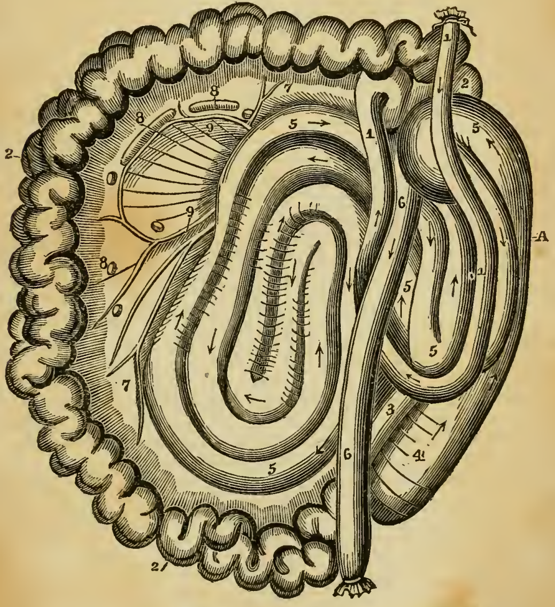
* As some guide to the researches of the veterinarian, the following extract from Dr. Abercrombie's valuable 'Pathological and Practical Researches' is introduced.

'Many cases are on record of chronic disease of the pancreas, exhibiting much diversity of symptoms, and nearly in the following proportion:—Of twenty-seven cases which I find mentioned by various writers, six were fatal with gradual wasting and dyspeptic symptoms, and without any urgent symptoms. In eight, there were frequent vomitings, with more or less pain in the epigastric region; and thirteen were fatal, with long-continued pain without vomiting; in some of these, the pain extended to the back, and in others it was much increased by taking food. In several there were dropsical symptoms, and in three or four there was jaundice from the tumour compressing the biliary ducts. In the morbid appearances aslo there was great variety.'

The larger intestines, particularly the colon and the cæcum, have not the cellated structure in cattle, which the slightest inspection of their external covering shows that they possess in the horse; and, consequently, the food will pass through them with considerably greater rapidity. Lest this however, should prevent the abstraction of all the nutriment which it contains, and thus interfere with the destiny of cattle—the furnishing of the human being with food while they are living and after they are dead—the intestinal canal is greatly prolonged. The intestines of the horse are ten times as long as the body of that animal; the intestines of the ox are twenty-two times as long as his body.

Each intestine shall be briefly described.



1. The Duodenum.
2. The Jejunum.
3 The Ileum.
4. The Cæcum.
5. The Colon.
6. The Rectum.
7. The Mesentery.
8. Mesenteric Glands.
9. Blood-vessels.

THE DUODENUM.

This, as will be observed at *a*, p. 203, in the Treatise on the Horse, is of considerable size in that animal compared with the small intestines; but it will be remarked (*g*, p. 426, and *fig.* 1. in this cut) that the duodenum is, at its commencement from the stomach, little larger than the jejunum and ileum, which are prolongations from it. The stomach of the horse is an exceedingly small one; the food necessarily passes quickly out of it, and the work of digestion, so far as the stomach is concerned, namely, the dissolving of the food, and the conversion of it into one homogeneous mass, is imperfectly performed: therefore it is detained in the upper portion of the duodenum for this solution to be completed, or as much so as the nature of the food will admit, before the true function of this intestine commences. In consequence, however, of the maceration of the food in the rumen, the double mastication, and the mechanism of the manyplus, by means of which every fibrous particle is seized and ground down, the food is nearly dissolved before it enters the fourth stomach; it is easily completed there, and the duodenum has nothing to do of this natuie. On this account, the duodenum of the horse is a capacious one; it is a kind of second stomach: while the duodenum of cattle is little larger than the small intestines which succeed to it.

The duodenum and all the intestines have, like the stomachs, three coats. The outer one is the peritoneum, or the membrane by which all the contents of the belly are invested; by which also they are all confined in their natural situations, and by the smoothness and moisture of which, all injurious friction and concussion are avoided. The second is the muscular coat, supplied by the motor organic nerves, and by means of the contraction of which the food is propelled along the intestinal canal in the process of healthy digestion, or hastened when those muscles are made to contract more rapidly and violently under the influence of irritation, whether referrible to disease or to some purgative drug. The inner coat is a mucous one, thickly studded with minute glands, which, in a state of health, secrete sufficient mucous fluid to lubricate the passage; and, under the stimulus of a purgative, throw out a fluid increased in quantity, and of a more aqueous character, and in which the contents of the intestines are softened and involved and carried away.

On this coat likewise open the mouths of innumerable vessels—the lacteal absorbents—which imbibe or take up the nutritive portion of the food. These vessels ramify across the mesentery, and convey this nutriment to a common duct that passes along it, and by means of which it is carried into the great veins in the neighbourhood of the heart, where it is mixed with the venous blood returned from every part. By the power of the heart it is propelled through the lungs, wheie it is purified and vitalized; and having been returned to this organ it is driven through other vessels all over the frame, and bestows nutriment and life on every part.

The food, in a state of perfect solution, and under the name of chyme, is forced on by the muscular coat of the fourth stomach into the duodenum, where another change immediately commences. The food is separated into two distinct portions or principles—that which is nutritive or capable of being imbibed by the lacteals—a white fluid called chyle—and that which is either innutritive, or which they reject, and which is propelled along the intestines and finally evacuated.

There has been much dispute as to the manner in which this separation is effected. The chyme that has been formed by the agency of the gastric juice may contain in itself a tendency to this separation, or precipitation of the excrementitious part; or this may be effected by some fluid secreted from the mucous coat of the duodenum; or the bile and pancreatic juice may be the main agents in producing the change.

Ten or twelve inches down the duodenum, as may be seen at *h*, p. 426, two ducts penetrate the coats of that intestine, and pour into it the fluid secreted by the pancreas and liver. It would seem likely, from the distance from the stomach at which these fluids enter, that some change had already taken place in the contents of the duodenum, which was to be perfected by means of these auxiliaries. The separation or precipitation is more rapidly and effectually made; while the bile also has some stimulating effect on the coats of the stomach, urging the exhalents and the absorbents, and the muscles of the intestines, to stronger and more effectual action; and the pancreatic juice may dilute the biliary secretion, and shield the intestine from its occasional too great acrimony.

While, however, the bile is thus acting in promoting healthy digestion, (and no animals afford more frequent illustration of the connection between the biliary secretion and the digestive process than cattle do,) the true notion of it is perhaps, that it is an excrementitious substance, containing properties that would be noxious to the constitution, but, as in most of the contrivances of nature, the mode of its evacuation answers another and a salutary purpose.*

The length of the duodenum varies according to the fancy of different writers. It terminates in the jejunum, but there is no assignable point where the one can be said to terminate and the other begin.

THE JEJUNUM AND ILEUM.

These intestines, together with the duodenum, the cæcum, and a portion of the colon, will be seen (in the cut p. 467, at *figs.* 2 and 3,) to be united together, and enfolded in one common expansion of the mesentery. They lie on the right side of the belly, occupying the flank, and resting upon the right portion of the rumen. The jejunum and the ileum constitute the border of this mesenteric expansion, and are disposed in the form of numerous spiral convolutions. If they were unfolded, the length of these intestines would, in an ox of common size, amount to more than 100 feet. This length of small intestine is designed to compensate for the want of development and of cancelli in the larger ones. The food is detained by the length of the passage, and also by the construction of the convolutions. They may be considered as discharging the function of the cæcum and colon in the horse, and the principal absorption of chyle takes place in them.

THE CÆCUM

Is a very different viscus from that which bears the same name in the horse. It describes a considerable arch (see *fig.* 4, p. 467,) the superior extremity of which is fixed to the portion of mesentery common to it and the small intestines, while the inferior portion floats loose in the abdomen, and is prolonged into the pelvic cavity, where it has a rounded termination. The portion of food that can enter into it is smaller than in the horse, and cannot be detained long there, because there are no longitudinal bands to pucker the intestine into numerous and deep cells; but the contents of the cæcum have the same character of being more fluid than in any other part of the intestinal canal. The length of the cæcum differs little from that of the horse, seldom exceeding a yard.

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* The gall of the ox is applied to various uses; it was formerly used medicinally, as readily combining with the hardened wax of the ear, and contributing to its easier removal, and also as a mild and beneficial external stimulant in cases of inflammation of the ear, and particularly those of a chronic character, and connected with partial deafness. It has also been adopted as a stimulant in some cases of ophthalmia, and old people used to think that it was beneficial in difficult menstruation, and also in difficult labour.

In commerce its value is of a more decided character. It is boiled and skimmed; one ounce of alum is then added to each pint of the gall; to another pint of the gall one ounce of common salt is added; the liquids are placed in separate bottles, corked down, and kept close for three months; the clear portion is then poured off from each, and the contents of the two bottles being mixed together, a precipitation or coagulum is rapidly formed, leaving a portion of the liquid above clear and colourless. This is called refined ox-gall. It is considered by some to possess a cosmetic quality; it certainly combines with the greasy matter with which old paintings may be stained, and also with that which may have been mixed with various colours; it gives a coating to ivory, and even to tracing paper and to satin, which enables the artist to paint with water colours upon them, and to lay successive coats of colours when drawing, and to fix chalk and pencil drawings so that they may be tinted. An extract of ox-gall has also been used instead of soap, more readily and effectually to clean greasy cloths.—*Gray and Rennie's Supplements to the Pharmacopœia.*

THE COLON.

This intestine is evidently divisible into two parts, (see *fig.* 5, p. 467;) the one smaller than the cæcum is supported by the common mesentery, the other floats loose in the belly, and forms part of the second mass of intestines. It has somewhat the same convolutions as in the horse, but is destitute of its muscular bands. It is also less than the cæcum, but, combined with the next and the last intestine, the rectum, it measures more than thirty-three feet, being almost double the length of those intestines in the horse. The want of mechanical obstruction to the passage of the food is thus made up by the increased length of the viscera. In the colon, the process of digestion may be considered to be in a manner terminated, and all that remains is fæculent matter, that continues to be urged on in order to be expelled.

THE RECTUM.

This intestine, so called from the straight course which it runs, terminates the digestive canal. It also has no longitudinal bands, for it contains little beside the excrement that is to be discharged, or that should least of all be detained. The lacteal absorbents may still be traced in this intestine, but it is probable that very little nutritive matter is taken up, although, from the occasional hardened state of the dung, it is possible that much fluid may be carried off.

A circular muscle, always in action, is placed at the termination of the rectum, in order to prevent its contents from being involuntarily discharged. Its power is just sufficient for the purpose; and it readily yields, when, by the pressure of the abdominal muscles and the diaphragm, the excrement is forced against it, in the voluntary efforts of the animal.

The contents of the rectum in cattle are essentially different from those that occupy the same intestine in the horse. They are semi-fluid—their nutritive qualities are nearly exhausted, and they are of very inferior value for agricultural purposes.

The scientific author of the treatise on 'British Husbandry,' in the Farmer's Series, p. 227, says, that 'when used alone, cow-dung has been considered, in most cases, as nearly worthless. It has also been thought that the dung of milch-cows is inferior to that of oxen; but this can only be attributed to their yielding milk, which probably deprives the dung of some portion of its richness, for when they are dried off and fattened, there is no perceptible difference.' He makes two quotations in illustration of the inferior quality of the cow-dung—one from the Essex Report, vol. ii. p. 238, in which it is stated that 'fifteen acres having been manured for beans, six with horse-dung, and nine with dung from the cow-yard, the six acres produced far more than the nine,' and that 'in an experiment made near Grantham, in Lincolnshire, on a poor dry soil, the manure from a horse-yard, and that from a yard where neat cattle were wintered, were used separately for turnips, and the former was found to have greatly the advantage.' He adds, however, that ' mixed with other kinds of manure, it is exceedingly valuable; that although its effect upon the soil is slower and less powerful than that of horse dung, it is more durable, and that upon sand and gravel, and a dry and warm soil, its cooling qualities render it of much service." The comparison which he draws in other respects, between the two kinds of dung will be found to be interesting and instructive.

THE DISEASES OF THE INTESTINES.

These, with the exception of diarrhœa, are seldom so acute or fatal as in the horse, but they are too numerous, and destroy too many of our cattle. Those which belong to the membranes that invest or line the intestines, and that are referrible to the greater part, or the whole, of their extent, will with most convenience first come under consideration. Those which affect only particular viscera, or parts of them, will naturally follow.

ENLARGEMENT OF THE MESENTERIC GLANDS.

It has been stated that there are numerous vessels, termed lacteals, opening on the inner coat of the intestines, in order to convey the chyle to the thoracic duct, so that it may mingle with and supply the waste of the blood. These little vessels, ere they reach the main trunk, pass through a glandular body, in which some unknown change is probably effected in the chyle. Some of these mesenteric glands are represented at *fig*. 8, page 467. These glands occasionally become unnaturally enlarged, and then, whether from the abstraction of so much nutriment, in order to contribute to this enlargement, or from the unknown change not taking place in the chyle before it mingles with the blood, or from the constitutional disturbance which the presence of such a body in the abdomen must produce, the animal ceases to thrive, his belly becomes enlarged, cough and consumption appear, and he gradually wastes away and dies. On examination after death, some of the mesenteric glands are of unusual bulk, and occasionally have grown to an enormous size.

Mr. Brown, of Melton, has recorded a case of singular enlargement of one of these glands.* He was sent for to examine a cow with considerable depression of countenance, the eyes shrunk in their orbits, the membrane of the nose and the mouth of a pale yellow colour, and the skin around the eyes, nose and mouth also presenting the same tinge. The pulse was quick, the breathing difficult, the belly swelled, and she could scarcely be induced to move. When the hand was passed along the right side, a large tumour could be distinctly felt, and which would not yield to pressure.

Mr. Brown very properly decided that the case was hopeless, and advised that she should be destroyed. She was, however, given up to him for experiment. He determined first to try the effect of mercury, and he gave her every night two scruples of calomel, with a drachm of hemlock, and half a drachm of opium; he also administered four ounces of Epsom salts every morning, in eight ounces of infusion of cascarilla. A more judicious plan of treatment he could scarcely have adopted. As soon as purging commenced, he omitted the internal medicine, shaved the hair from the right side, and well rubbed in daily an ounce of strong mercurial ointment with a drachm of camphor. This was continued for six days; but the patient continuing to lose flesh, and becoming so weak as not to be able to raise herself up when down, and the tumour not diminishing, he ordered her to be destroyed.

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* Veterinarian, Feb. 1830.

On opening the abdomen, the first thing that presented itself filling the iliac region was a large mesenteric gland, of irregular form, weighing 160lb. On making a section through it, its appearance was chiefly that of a schirrous deposit. The mesenteric glands generally were unhealthy, and many of them were schirrous. This case is a valuable one; it is the only one on record of schirrous enlargement of the mesenteric glands of the ox; but the recollection of every practitioner will furnish him with not a few instances of these tumours unexpectedly presenting themselves on examination of the abdomen. They have been found chiefly in young beasts that had been bred too much in and in, or that had been weakly from other causes, and particularly in those that had been subject to chronic cough, associated with tubercles in the lungs. In low and damp situations these tumours have been found on the mesentery of cattle that have been long unthrifty and out of condition, and that have at length died apparently in consequence of some other disease.

The association, however, with these diseases has differed so materially in different cases, and the symptoms have been so obscure, or so much resembling those of various and almost opposite complaints, that they have not yet been satisfactorily classed and arranged. This also must be the work of future veterinarians, and when cattle medicine begins to receive that attention which it deserves.

The treatment of these mesenteric enlargements, when they are suspected and pretty well ascertained, would be a course of mild purgatives, mingled with tonics (the Epsom salts with gentian and ginger, a dose sufficient to keep the bowels gently open being administered every morning,) with the exhibition of from six to ten grains of the hydriodate of potash, at noon and night, and the removal of the animal to good and dry pasture.

INFLAMMATION OF THE BOWELS.

Of this malady, as in the horse, there are two species: the first is inflammation of the external coat of the intestines, accompanied by considerable fever, and usually by costiveness; the second is that of the internal or mucous coat, and generally attended by violent purging.

The first of these, designated by the term EETERITIS, is, in most cases, sudden in its attack. Beasts of middle age—strong—in good condition, and particularly working cattle, are most subject to it. Calves, old beasts, and milch cows are comparatively exempt from it. The disease is most frequent in hot weather, and after long-continued drought.

The beast, that on the preceding day seemed to be in perfect health, is observed to be dull—depressed—his muzzle dry—his hair rough;—he shrinks when his loins are pressed upon, and his belly seems to be enlarged on the left side. To these symptoms speedily succeed disinclination to move—weakness of the hind limbs—trembling of them—staggering—heaving of the flanks—protrusion of the head—redness of the eyes—heat of the mouth and ears and roots of the horns, and a small, but rapid pulse, generally varing from 60 to 80 beats in a minute. Rumination has now ceased; the appetite is lost; the fæces are rarely voided, and are hard and covered with a glazy mucus, and that mucus is sometimes streaked with blood;—the animal also moans with intensity of pain.

These symptoms rapidly increase; the patient becomes more depressed; the pulse more feeble; the moaning incessant, and the beast is continually down. He becomes half unconscious, and is evidently half-blind;

the mouth is filled with foam, and the tongue is covered with a brownish yellow deposit. There is grinding of the teeth, and difficulty in the swallowing of liquids; a tucked up appearance of the belly, mingling with the enlargement of the left flank—and the whole of the belly is exceedingly tender. Until he is too weak to raise himself, he is exceedingly restless, lying down, and immediately getting up again, and with convulsive movements of the muscles of the neck and extremities. The evacuation of the fæces is entirely suppressed, or a little stream of liquid excrement forces a passage through the hardened mass by which the rectum is distended, and that which is voided has an exceedingly fœtid and putrid smell. This symptom is characteristic. The person who is accustomed to cattle says, that the beast is *fardel-bound* or *sapped*, but he often mistakes the nature of the case, and fancies that diarrhœa instead of costiveness exists. The urine becomes thick and oily and brown, and has a peculiarly disagreeable and penetrating smell. As the disease proceeds, the weakness and suffering increase, until the animal dies, sometimes exhausted, but mostly in convulsions, and frequently discharging a bloody fœtid fluid from the mouth, the nose, and the anus.

Sometimes, when the disease has not been attacked with sufficient energy, and oftener in despite of the most skilful treatment, other symptoms appear. The animal seems to amend; the pulse is slower and more developed—rumination returns—the patient eats a little—the enlargement of the flanks subsides—the excrement, whether hard or fluid, is more abundantly discharged: but the beast is sadly thin—he is daily losing ground—his coat stares—the hair is easily detached—the skin clings to the bones—he is sometimes better, and sometimes worse, until violent inflammation again suddenly comes on, and he is speedily carried off.*

On examination after death the first thing that presents itself is the engorgement of the sub-cutaneous vessels with black and coagulated blood, and the discoloration of the muscles, softened in their consistence and becoming putrid. The abdomen exhibits the effusion of a great quantity of bloody fluid; eight, ten, and twelve gallons have been taken from it. The peritoneum is inflamed—almost universally so;—there are black and gangrenous patches in various parts, and on others there are deposits of flaky matter, curiously formed, and often curiously spotted. The liver is enlarged and its substance easily torn; the rumen is distended with food, generally dry, and its lining membrane inflamed and injected, and of a purple or blue tint; the reticulum does not escape the inflammatory action; the manyplus is filled with dry and hard layers which cannot be detached without difficulty from the mucous membrane of that stomach; the fourth stomach is highly inflamed, with patches of a more intense character, and its contents are liquid and bloody, particularly towards the pyloric orifice. The small intestines contain many spots of ulceration, the lining membrane is every where inflamed, and they are filled with an adhesive or bloody mucous fluid; the larger intestines are even more inflamed, they exhibit more extensive ulceration, and contain many clots of effused blood. The rectum is ulcerated and gangrenous from end to end.

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* Hurtrel D'Arboval, in his 'Dictionary of Veterinary Medicine and Surgery,' thus describes some of the symptoms in a more than usually aggravated case. 'The convulsive movements were exceedingly violent. The animal, seemingly afraid of every thing around him, dragged himself along, and beat himself about in every direction, uttering the most frightful lowings. His tongue, red and swelled, hung from his mouth; the nostrils were dilated; the eyes haggard and full of tears; all the mucous membranes were of a scarlet red; the ears and horns were burning, as also was the whole surface of the body. The beatings of the heart were violent and rapid, yet the pulse was scarcely perceptible, and no blood could be obtained from the jugular.'

There is usually considerable effusion in the chest; the coverings of the lungs are inflamed; the bag of the heart more so; the substance of the lungs is sometimes emphysematous, and at other times gorged with blood, and the heart is marked with black spots outwardly, and in its cavities. The lining membrane of all the air-passages is of a red brown colour; the larynx and the pharynx are intensely red, and so is the membrane of the gullet.

Of the causes of this disease it is difficult to speak. It seems occasionally to be epidemic, for several instances of it occur of the same character, and in the same district. M. Creuzel gives an illustration of this in his description of the disease that destroyed so many cattle in the years 1826 and 1827, in the department *de la Nièvre.* Out of 218 cattle belonging to three farmers, 113 were attacked by the disease, and 83 of them died. One farmer, in a neighbouring district, had 19 head of cattle, all of whom sickened, but only three of them were lost. These were unusually hot summers. The upland pasture was burnt up, or what remained of it was rendered unusually stimulating; and the acrid plants of the marshes and low grounds acquired additional deleterious agency.*

When isolated cases occur, they may generally be attributed to mismanagement. Exposure to cold, or the drinking of cold water when heated with work; too hard work in sultry weather; the use of water stagnant, impure, or containing any considerable quantity of metallic salts; the sudden revulsion of some cutaneous eruption; the crowding of animals into a confined place; too luxuriant and stimulating food generally; and the mildewed and unwholesome food on which cattle are too often kept, are fruitful sources of this complaint.

WOOD-EVIL, MOOR ILL, PANTAS.

These are but varieties of the same disease, frequently produced, as the first name would import, by browsing on the young buds of trees, and particularly on those of the ash and the oak. These buds are tempting to cattle at the commencement of the spring, but they are of too acrid and stimulating a character to be eaten with impunity in any considerable quantities. Heat of the mouth and skin—redness of the membranes—thirst—obstinate constipation—hardness of the little fæces that are expelled—the covering of them with mucus and blood—difficulty of voiding urine, and its red colour and penetrating odour—colicky pains—depression—are the characteristic symptoms of this disease.

Some veterinarians give the name of wood-evil to complaints allied to rheumatism, or being essentially rheumatic; others consider it to be a disease of debility, looking to the consequence of inflammation, and not to the inflammation itself. If any distinction were drawn between wood-evil and enteritis in cattle, it would be, that although in wood-evil there seems to be more affection of the head, and the animal appears now and then as if it were rabid, there is not so much intestinal inflammation, and the disease does not so speedily run its course.† Wood-evil may last from twelve to twenty days.

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* Rec. de Méd., Oct. 1828, p. 243.

† M. Girard observed in 1816, a similar disease among the cows in a village near Brie. At the commencement the animals were dull, disinclined to eat, spume dropped from the mouth, and the spine was tender. There ran from the vagina of the cow a bloody matter, of a peculiar smell, which the urine also possessed. The constipation was obstinate; the dung was hard and in pellets, and covered with streaks of blood. The animal remained in this state twenty-four hours, after which the bloody evacuations ceased; the patient became palsied behind; violent diarrhœa followed, fœtid, and infectious, and the patient was presently lost.—*D'Arboval, Dict. de Vét. Méd.*

The prognosis, or expectation of the termination of the disease is always unfavourable when after a certain time much fever comes on, or the costiveness will not give way, or the urine is thick or bloody, or the disease attains its full intensity in the space of a few days. Then, instead of terminating in resolution, the inflammation runs on to gangrene; all the acute symptoms suddenly disappear, and death is not far distant. On the other hand, the result will be favourable when the disease does not reach that degree of intensity of which it is capable; when, after a few days, the symptoms gradually disappear, and the animal regains his former habits, and the excrement resumes its natural form and consistence.*

The history that has been given of this disease will leave little doubt respecting the course of treatment that should be pursued. A malady of so intensely an inflammatory character should be met by prompt and decisive measures: and to them it will, in its early stage, generally yield. Nothing is so easy as to give relief to a sapped or fardel-bound beast, before he begins to heave at the flanks or ceases to ruminate; but quickness of breathing, and heat of the mouth, and evident fever, being once established, the animal will probably be lost.

The patient should be bled. If it is simple costiveness without fever the abstration of six or eight quarts of blood may suffice; but if the symptoms of inflammation cannot be misunderstood, the measure of the bleeding will be the quantity that the animal will lose before he staggers or falls. Purgatives should follow—the first dose being of the full strength, and assisted by quickly repeated ones, until brisk purging is produced. Hot water, or blisters, should be applied to the belly, and the food of the beast should be restricted to gruel and mashes. This will, in most cases, include the whole of the treatment.

If other symptoms should arise, or other parts appear to be involved, the practitioner will change his mode of proceeding accordingly; but he will be cautious how he gives aromatics or tonics, until he is convinced that the state of fever has passed over, and circumstances indicate the approach of debility and of typhus fever.

DIARRHŒA AND DYSENTERY.†

The frequent and abundant evacuation of fæcal matter, whether with or without mucus, may be considered either as simple, or connected with other diseases. In its former state it will be the subject of present consideration, and may be regarded as acute or chronic. Acute diarrhœa may be produced by various causes;—the abuse of purgatives, by their being administered in too active a form—feeding on certain poisonous plants—sudden change of food, generally from dry to green aliment, but occasionally from green to dry—excess of food—the drinking of bad water—or by some humid and unhealthy state of the atmosphere. From the last cause it usually assumes an epizootic character, particularly in autumn. A great many cows in a certain district are suddenly attacked by it, although there is no reason to suspect that it is in the slightest degree contagious.

Calves and milch cows are far more subject to this species of intestinal inflammation than are full grown or working oxen.

The proper treatment of acute *diarrhœa* will consist in the adminstration of a mild purgative, in order to carry off any source of irritation in the intestinal canal; the abstraction of blood, if there is any degree of fever, and in proportion to that fever; and then the exhibition of alkalies and astringents. The most effectual medicines are prepared chalk, opium, catechu, and ginger, in the proportions of one ounce of the first, one drachm of the second, four drachms of the third, and two of the last in each dose, and to be administered in thick gruel.

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* D' Arboval, Dict., Article *Enterité*.

† The distinction between these two diseases, and it is of essential importance to observe it in the treatment of cattle, is, that diarrhœa consists in the evacuation of fæcal matter, in an undue quantity, and more than naturally liquid form. In dysentery, more or less mucus, or mucus and blood combined, mingles with fæces.

This will generally be successful: but, occasionally, these acute cases of diarrhœa are obstinate and fatal; and too often it happens that what has been represented to the practitioner as a sudden attack turns out to be the winding up of some chronic disease, and he does not discover the mistake until it is too late.

Diarrhœa is not always to be considered as a disease. It is often a salutary effort of nature to get rid of that which would be injurious; or it is a somewhat too great action of certain of the digestive organs, which soon quiet down again to their natural and healthy function. An occasional lax state of the bowels in calves is known to be favourable to the acquirement of fat; and a beast that is well purged on being first turned on spring-grass or turnips thrives far more rapidly than another that is little, or not at all, affected by the change. Diarrhœa, in some critical stages of disease, is to be hailed as the precursor of health, rather than feared as the attack of a new malady; it should be so in pneumonia, red water, and puerperal fever. All that is then to be done is to prevent its becoming so violent as to depress the vital energies. Diarrhœa may assume a chronic form, with greater or less severity, and producing loss of condition and debility; it may be prolonged for many a month, and even for years, and at length terminate fatally. This is often the case with cows that have been drained of their milk and badly kept. The diarrhœa of calves will be considered when the disease of those animals come under notice.

The treatment of chronic diarrhœa is difficult and unsatisfactory. Purgatives cannot be dispensed with, but they must be administered with considerable caution. Both the medicine and the quantity should be well considered, for if the aperient is not strong enough, the disorder will be increased and prolonged; and if it is too strong, both these effects will be produced to a greater extent, and fatal inflammation and superpurgation may ensue. Castor oil will be the safest, and the most effectual medicine, in doses from a pint to a bottle; and a small quantity, ten grains, of powdered opium, will not interfere with the aperient quality of the oil, while it may allay irritation. After two doses of the oil have been given, the powder already recommended may be tried, but with a double quantity of ginger, and half a drachm of powdered gentian. After a while, a drachm of the Dover's powder may be given, morning and night; and, that also ceasing to have effect, the first powder may again be administered. Alum whey is often of considerable service. If the animal is turned out, it should be on the driest pasture, but it will be better for her to be kept up with plenty of hay, and gruel to drink.

It is, however, with DYSENTERY that the practitioner is most loth to cope, a disease that destroys thousands of our cattle. This also may be either acute or *chronic*. Its causes are too often buried in obscurity, and its premonitory symptoms are disregarded or unknown. There appears to be a strong predisposition in cattle to take on this disease. It seems to be the winding up of many serious complaints, and the foundation of it is sometimes laid by those that appear to be of the most trifling nature. It is that in cattle which glanders and farcy are in the horse—the breaking up of the constitution.

Dysentery may be a symptom and a concomitant of other diseases. It is one of the most fearful characteristics of murrain; it is the destructive accompaniment or consequence of phthisis. It is produced by the sudden disappearance of a cutaneous eruption; it follows the cessation of chronic hoose; it is the consequence of the natural or artificial suspension of every secretion. Were any secretion to be particularly selected, the repression of which would produce dysentery, it would be that of the milk. How often does the farmer observe that no sooner does a milch cow cease her usual supply of milk than she begins to purge! There may not appear to be any thing else the matter with her, but *she purges*, and in the majority of cases that purging is fatal.

It may, sometimes, however, be traced to sufficient causes, exclusive of previous disease. Unwholesome food—exposure to cold—neglect at the time of calving—low and marshy situations—the feeding on meadows that have been flooded (here it is peculiarly fatal)—the grazing (according to Mr. Leigh, and our experience confirms his statement) upon the clays lying over the blue lias rock—the neighbourhood of woods, and of half stagnant rivers—the continuation of unusually sultry weather—over-work, and all the causes of acute dysentery may produce that of a chronic nature—or acute dysentery neglected, or badly, or even most skilfully treated, may degenerate into an incurable chronic affection. Half starve a cow, or overfeed her; milk her to exhaustion, or dry her milk too rapidly, dysentery may follow.

The following may probably be the order of the symptoms, if they are carefully observed. There will be a little dulness or anxiety of countenance, the muzzle becoming short and contracted—a slight shrinking when the loins are pressed upon—the skin a little harsh and dry—the hair a little rough—there will be a slight degree of uneasiness, and shivering, that scarcely attracts attention—then (except it be the degeneracy of acute into chronic dysentery) constipation may be perceived—it will be to a certain degree obstinate—the excrement will be voided with pain—it will be dry, hard, and expelled in small quantities. In other cases, perhaps, purging will be present from the beginning; the animal will be tormented with tenesmus, or frequent desire to void its excrement, and that act attended by straining and pain, by soreness about the anus and protrusion of the rectum; and sometimes by severe colicky spasms. In many cases, however, and in those of a chronic form, few of these distressing symptoms are observed even at the commencement of the disease, but the animal voids her fæces oftener than it is natural that she should, and they are more fluid than in a state of health; but at the same time, she loses her appetite and spirits and condition, and is evidently wasting away.

In acute cases, if the disease does not at once destroy the animal, the painful symptoms disappear, and little remains but a greater or less degree of dulness, disinclination to food, rapid decrease of condition, and frequent purging. The fæces are often voided in a peculiar manner; they are ejected with much force, and to a considerable distance, and the process of *shooting* has commenced. The fæces, too, have altered their character; a greater quantity of mucus mingles with them; sometimes it forms a great proportion of the matter evacuated, or it hangs in strings, or accumulates layer after layer under the tail. The farmer and the practitioner anxiously examine the evacuation. As the thin mass falls on the ground, bubbles are formed upon it? They calculate the time that these vesicles remain unbroken. If they burst and disappear immediately, the observer does not quite despair: but if they remain several minutes on the surface of the dung, he forms an unfavourable opinion of the case, for he knows that these bladders are composed of the mucus that lined the intestines, and which is not separated from them except under circumstances of great irritation; or which being thrown off, the denuded membrane is exposed to fatal irritation. In this state the beast may remain many weeks, or months; sometimes better, and sometimes worse; and even promising to those who know little about the matter that the disease will gradually subside. The farmer, however, has a term for this malady, too expressive of the result, although not strictly applicable to what is actually taking place within the animal. She is *rotten*, he says, and she dies as if she were so.

The writer of this treatise will not say, with one well-informed and skilful practitioner, that 'chronic diarrhœa invariably wears the animal down, sooner or later, in spite of all means,'* nor with another, that 'the animal loses its flesh, becomes exceedingly thin, and ultimately dies in despite of any treatment; and in this stage the cow-leeches have each their favourite specific, the only good of which consists in the money they can obtain for it.'† There are cases of recovery, but they are few and far between.

In most cases the tragedy gradually draws to a close. The beast is sadly wasted—vermin accumulate on him—his teeth become loose—swellings appear under the jaw, and he dies from absolute exhaustion; or the dejections gradually change their character—blood mingles with the mucus—purulent matter succeeds to that—it is almost insupportably fœtid—it is discharged involuntarily gangrenous—ulcers about the anus sometimes tell of the process that is going on within; and, at length, the eyes grow dim and sunk in their orbits, the body is covered with cold perspiration, and the animal dies.

In some cases the emaciation is frightful; the skin cleaves to the bones, and the animal has become a living skeleton; in others there have been swellings about the joints, spreading over the legs generally, occasionally ulcerated; and in all, the leaden colour of the membranes, the rapid loss of strength, the stench of the excrement, and the unpleasant odour arising from the animal himself, announce the approach of death.

The appearances after death are extraordinarily uniform, considering of how many diseases this is the accompaniment or the consequence, and the length of time that it takes to run its course, and during which so many other organs might have been readily involved. The liver is rarely in any considerable state of disease. The first and second stomachs are seldom much affected; the third stomach presents a variable appearance with regard to the state of the food that it contains, and which is sometimes exceedingly hard, and sometimes almost pultaceous, but there is no inflammation about the stomach itself. The fourth stomach exhibits a peculiar change: there is an infiltration or collection of serous fluid in the cellular substance between the mucous and muscular coat, showing some, but no very acute degree of inflammation in the submucous tissue. The small intestines are frequently without a single trace of inflammation, but sometimes, however, they are thickened and corrugated, but not injected. It is in the cæcum, colon, and rectum, that the character of the disease is to be distinctly and satisfactorily traced.

Mr. Cartwright, describing the morbid appearances in a beast that had died of dysentery, says 'that the colon and cæcum were inwardly of a dirty colour, with blackish streaks running over them in every direction.

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* Mr. Farrow.—*Veterinarian*, June, 1831, p. 316.

Mr. Hales.—Ibid., August, 1831, p. 438.

The parietes were very thin, without the least covering of mucus. The liver was the smallest I ever saw. It was perfectly sound, of a uniform clear light-blue colour, and firm in texture.'[*] In a subsequent communication,[†] he narrates the lesions of some other beasts that had been under his treatment. He thus speaks of the first case—'The plaits upon the fourth stomach were about an inch thick, and underneath the secreting coats there was contained a quantity of serum and lymph, which had the appearance of jelly.[‡] The cæcum had two or three small abscesses just under the inner coat, but which had not burst, and many places of it were marked with black streaks. The whole of the abdominal cavity was very white, and infiltrated with serum.' In the second case, he states, that 'the plates on its internal surface were much filled with serum, and which would gravitate when held in different positions. On the villous coat of the *large* intestines, and throughout them, were a great many reddish spots, and in other places there were whole patches of the same; and on wiping this red secretion off, the coat was found to be abraded or ulcerated, and the intestines between those spots were thickened.'[§]

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[*] Veterinarian, Feb. 1829, p. 71. [†] Ibid. Dec. 1831, p. 669.

[‡] Mr. Farrow also has noticed these serous depositions between the coats of the stomach.—*Veterinarian*, June, 1831, p. 316.

[§] It may not be uninteresting to give a short sketch of the symptoms and appearances after death, of dysentery in the human subject. Its identity with the rottenness of cattle will not be for a moment doubted. The quotation is selected from that most valuable work 'The Cyclopædia of Practical Medicine,' article Dysentery, by Dr. Joseph Brown.

'A case of this description may commence with feculent and liquid stools, and they may subsequently become mucous, with occasionally a slight admixture of blood, or they may be of the latter character from the beginning. There is little, if any, fixed pain in the abdomen, but considerable griping during the evacuation, and heat of the anus, with distressing straining. The dejections, however, do not exceed seven or eight times in the day. Difficulty of breathing and of voiding the urine attend severe cases of the disease. The appetite is generally impaired—the thirst considerable, and the tongue is sometimes furred. The mean duration of this slight form of the disease is from seven to eight days: it may be said to be never fatal, but it not unfrequently lays the foundations of chronic dysentery, and often leaves such a tenderness of the bowels, as renders them more prone than before to morbid action, from cold or other causes.

'A more intense form of the disease will be found of frequent occurrence when dysentery is prevailingly epidemic. Occasionally a well-marked rigor (shivering fit,) followed speedily by febrile heat, introduces the disease, while in other cases the first symptom is pain in the bowels, to which the mucous stools, characteristic of dysentery, in a short time succeed. In many instances, some slight derangement of the stomach or bowels, indicated by flatulency, costiveness, inappetency, and nausea, is experienced. When the disease is fully formed, the characteristic mucous, or muco-sanguinolent stools are passed very frequently, with great pain, and an extreme degree of straining. There is a warm skin—a hard, generally frequent and small pulse—the tongue is either covered with a white mucous coat, or it is dark and dry—there is great prostration of strength, and the urine is scanty and high-coloured, and is passed with pain and difficulty. The griping which *precedes* each evacuation is very distressing.

'Should no relief be afforded by the remedies employed, the prostration of strength becomes great, the pulse feeble, with coldness of the extremities, the tongue either furred and brown, or glazed and red; the discharges from the intestines are dark and offensive; the mind is low and desponding, and death sometimes takes place in a period varying from a fortnight to three weeks from the commencement of the attack: but much more frequently, even in bad cases, some mitigation of the symptoms is obtained, and the disease degenerates into a chronic form.

'Restoration to health may be expected when there is diminution of pain in the abdomen, of straining, and of the frequency of discharges, and especially, if, instead of the mucous or muco-sanguinolent dejections, the stools became natural. An abatement of the febrile symptoms, and thirst, and a return of appetite, are all favourable symptoms: but all favourable symptoms are to a certain extent fallacious, for, after a truce of a few days, we may discover that we have that insidious and slowly wasting disease, chronic dysentery to combat. Chronic dysentery may be considered as almost a more

Hurtrel D'Arboval, when describing the disease under the names of diarrhœa and dysenteric enteritis, thus writes of the first variety: 'The mucous membrane of the large intestines is more or less red and thickened, offering sometimes erosions, and at other times characters of extravasation of blood, or being black, without consistence, and diffusing a noisome odour.' Of the second he says, 'there was more considerable thickening of the mucous membrane, with different shades of redness, and frequent deep ulcerations. The muscular coat of the intestine was untouched, and presented a sort of floor for the ulcerations. These ulcers were more numerous in the rectum, and towards the curvature of the colon, than in any other part of the large intestines; many other organs presented some morbid change, in proportion as they had participated more or less in the inflammation, but they were only secondary changes, and deserved little attention.'

The account of these *post mortem* appearances is given at considerable length, because they clearly indicate the hitherto unsuspected nature of the disease—unsuspected at least among veterinarians; and they will probably lead to a mode of treatment that promises a little more success than has hitherto attended the efforts of practitioners. It is plainly *inflammation* (at first acute, but gradually assuming a chronic, a more insidious and

distressing termination of the acute form than death itself, for recoveries from it are rare. The fever which attends the acute form subsides, and a temporary recruiting of strength and appetite is experienced, but this truce from distress proves deceptive. The patient occasionally feels sharp pains of the bowels, with frequent stools, consisting of food apparently little changed by the process of digestion, mixed with slight streaks of blood: these symptoms may subside and continue to occur at intervals, either from some manifest imprudence in regimen, or without any assignable cause, until extensive disorganization of the intestine takes place. The stools are then mucous and bloody, sometimes mixed with purulent matter, varying from three or four, to seven or eight times in the day—the abdomen feels full and hard, and without being very painful on pressure—the urine is high-coloured, and is passed with pain. The patient when in bed lies on his side, with his body much curved, so as to relax the muscles of the abdomen as much as possible. The pulse is feeble, intermitting, and generally slow; the skin is cold, sallow, dry, and rough; emaciation proceeds rapidly, the feet and legs become œdematous, and ascites occasionally takes place; the patient sometimes becomes jaundiced, and finally, after the lapse of weeks or months, he sinks from irritation and exhaustion.

'The pathological appearances vary according to the period of death, and the nature of the case. If dysentery prove fatal in an early stage, the appearances are those of inflammation simply, or of inflammation and gangrene of the mucous membrane of the large intestines, with few or no traces of inflammation. If at a more advanced period, the other coats of the bowels are found to participate in the disease, and numerous and extensive ulcers are discovered. The external appearance of the bowel is healthy, but on opening it, portions of its mucous membrane throughout the whole extent of the colon and rectum, and occasionally some part of the small intestines, are found of a bright red and brownish colour, and sensibly elevated above the level of the more healthy parts. These inflamed portions are sometimes covered with a puriform, sanguineous, or sanious secretion, which gives them the appearance of ulceration, but if this is scraped off with the back of a scalpel, the surface is found unbroken.

'In cases which have terminated fatally in a more chronic way, there is thickening of the tunics of the intestine, and the bowel is contracted in diameter and ulcerated. The ulcers are diffuse or follicular. The former may be of the size of a sixpence or a shilling, or an extensive portion of the membrane may be in a state of almost continued ulceration, the diseased surface being varied by portions in a state of red fungous elevation running irregularly over it. The ulceration occasionally perforates the coat of the intestine so as to allow its contents to escape into the cavity of the abdomen. Adhesion to the neighbouring viscera and serous effusion into the cavity of the abdomen are not unusual occurrences.

'The mesenteric glands are sometimes enlarged—the liver is occasionally found small and indurated, or enlarged and at the same time of a firmer consistence than natural, or an abscess has been formed in it, but changes in its structure are much less frequent than was imagined, and by no means essential to dysentery.'

dangerous form) *of the large intestines, the colon, cæcum, and rectum*; *it is the dysentery of the human being;* it is that which was once the scourge of the human race, but thousands of whose victims are now rescued from its grasp by the discovery of its real seat and character, and the adoption of those measures which such a disease plainly indicates.

If this malady is of an inflammatory type, the first, and most obvious, and most beneficial measure to be adopted is bleeding; and this regulated by the age, size, and condtion of the beast, the suddenness and violence of the attack, and the degree of fever. From two to five or six quarts of blood should be abstracted. There must be very great debility—the disease must in a manner have run its course, or the practitioner will be without excuse who, in a case of inflammation of the large intestines, neglects the abstraction of blood. General bleeding—bleeding from the jugular—will be of service, as lessening the general irritation, and the determination of blood to the part; but in this case the practitioner can in some measure avail himself of the advantage of local bleeding, for by opening the subcutaneous or milk vein he takes blood from the parietes of the abdomen, and from that portion of them which is nearest to the inflamed part.

The repetition of the bleeding must depend on circumstances, of which the practitioner will be the best judge.

If this has not been the common practice in the treatment of dysentery, it must be attributed to the disgraceful state of veterinary education so far as cattle are concerned, in consequence of which so few persons have been aware of the nature of the disease. The author, however, is happy to be enabled to refer to Mr. Sorby, (with whose present residence he is unacquainted,) to Mr. Storry, of Pickering, to Mr. Baker, of Reigate, and to his friend Mr. Dickens, of Kimbolton, as having long, and with evident advantage, had recourse to this best antagonist of inflammation.

As another abater of inflammation, the veterinary surgeon will next administer a mild aperient. A little consideration will show that this is not contra-indicated even by the degree of purging which then exists; for the retention of matter, such as that discharged in dysentery, must be a far greater source of irritation than the stimulus of a mere laxative.

The kind of medicine is a consideration of far more consequence than seems to be generally imagined. There would be a decided objection to the aloes so frequently resorted to in these cases: there would be some degree of doubt respecting that excellent and best medicine for general purposes, the Epsom salts. Both of them might add to the excessive irritation which the practitioner is so anxious to allay. Castor oil will here, as in acute diarrhœa, be decidedly preferred, and in the same doses. Some judgment will be required as to the repetition of the purgative. Its object is the simple evacuation of morbid fæcal matter, and not the setting up of any permanently increased action of the bowels: therefore, if instead of the comparatively scanty and mucous discharges of dysentery, a fair quantity of actual fæces has been brought away, there can be no occasion for, or, rather, there would be objection to, the continuance of the purgative. The author could refer to many a practitioner, justly held in estimation by the agriculturist and by his brethren, for testimony to the beneficial effect of mild aperients in the early treatment of dysentery. They may differ, they may a little err in the choice of the purgative, but they unite in the principle. The names of his friend Mr. Sewell, of Brighton, Mr. Baker, of Reigate, Mr. Nobbs, of Cattistock, and Mr. Sorby, immediately occur to him. Mr. Baker gives linseed oil, which certainly stands next in value to the castor oil as an aperient, when the bowels are in an irritable state.

This being inflammation of the large or lower intestines, there will be evident propriety in the administration of emollient injections. These intestines, although longer than in the horse, are not so capacious as in that animal; and they have not that irregular and celated structure, which prevents the injected fluid from filling, or even reaching them to any extent. By means of the newly invented enema-pump, the intestines in the ox, which are the seat of this disease, may be completely filled with some emollient fluid; and that which is most of all indicated here, and especially in the early stage of treatment, is gruel, well-boiled and thick; a pailful of it may be thrown up with advantage two or three times every day.

Let it now be supposed that this treatment has been pursued two or three days;—if the discharges are more fæcal, a little greater in quantity, and attended by less pain or less effort in the expulsion of them, that purpose has been effected which the practitioner was anxious to accomplish, and he must look about for other measures; or, if the state of the animal remains the same, it will be useless longer to pursue this plan. Then the surgeon refers once more to the character of the malady—inflammation of the mucous membrane of the large intestines—and he asks what he can bring in direct contact with the diseased surface, that is likely to allay irritation or to abate inflammation. He does not long hesitate here. Opium immediately presents itself, at once an astringent and an anodyne—an astringent, because it is an anodyne—and he determines to give it in doses of half a drachm, and in the best form in which it can be administered, namely, in that of powder, mixed with thick gruel. He likewise adds it to the gruel of the injection, either under the form of powder, or he boils a few poppy-heads in water, and then causes the gruel to be made with the decoction.

Here all practitioners seem to agree. Whether they prepare the way for the opium by the administration of an aperient, or whether, deceived by the state of purging, they give it at once, they are all anxious to try the power of this drug; but too many of them, either forgetting or not knowing the nature of the disease, add medicines of an opposite character, and that cannot fail of being injurious. They administer astringents and tonics, which are useful and indispensable in a later stage of the treatment, but, while the inflammation remains unsubdued, are only adding fuel to fire. There are too many practitioners who scruple not to give alum and sulphate of zinc as soon as they are called in to such a case; and before the lining membrane of the intestines is prepared for their action. These drugs are acrid—they are caustic as well as astringent—they are astringent because they are caustic, and they too frequently set up another and destructive inflammation. No better illustration than this would be required of the lamentable consequence of the utter neglect of the diseases of cattle in the system of veterinary instruction south of the Tweed. When will agriculturists and agricultural societies awake to a sense of their true interest?

It is usual, however, to add something to the opium, in order to increase or to regulate, or to modify its power; and that which is without comparison the most serviceable is one of the mild preparations of mercury, viz. calomel, or the blue pill, or mercury triturated with chalk. Mere theory might induce the fear that mercury would add to the irritation already too unmanageable, and so it would, if given alone; but, combined with and guarded by the opium, it has the most beneficial effect: the opium does not produce costiveness—the calomel does not gripe and purge, but irritation is allayed, while the natural action of the bowels is promoted.

Mr. Dickens gives calomel and opium. In a letter with which he favoured the author, in 1831, he says, 'This disease has been very prevalent in our neighbourhood this spring, and I have been tolerably successful in the treatment of it. I at first administered the various astringents, as chalk, kino, opium—but much to my disappointment, I found little or no good effect from them. I then administered one drachm each of calomel and opium in some good thick gruel, which I consider of the greatest importance, acting as a sheath to the intestines, already under a state of excitement. I repeat this according to the size of the animal, and the violence of the disease, but I have rarely had occasion to repeat the dose more than twice in the course of three or four days, continuing to give the gruel in the interval; but I ought to state, that if the disease is of recent date, or what Mr. Blaine calls acute, I always bleed.'

Mr. Sewell also gives calomel, but without the opium. He, with his usual openness and humour, thus describes his practice, and at the same time shows the injurious and undeservedly low estimation in which veterinary surgeons are held by many farmers, and in which they will be held until the public are assured that they are competently instructed in the treatment of neat cattle:—'I have frequently seen bullocks at farmhouses, (when I have been attending a horse for the owner,) that have been a long time ill with diseased liver and constipated bowels, and been under the treatment of what they call a skilful cow-leech, who has at length given them up as incurable, and the animals have been, comparatively speaking, wasted to skin and bone. I have now and then asked the farmer to allow me to undertake the case; I have given calomel, aloes, and sulphate of soda; I have brought the liver into action by repeating my doses at intervals, and keeping the animal upon bran-mashes and linseed; and he has recovered, returned to his work, and afterwards grazed and fatted as well as any other beast. Yet the very men for whom I have done these things, when they have fresh cases, send for the cowleech in preference to me.'*

The author will not again contest with his scientific friends the question on which his opinion has been already freely stated, respecting the nature and seat of this disease—inflammation of the large intestines, and no necessary affection of the liver—but he is happy in being enabled to add his decided experience of the efficacy of mercurial preparations in this malady.

Mr. Meyer gives a favourable report of the blue pill, combined with Dover's powder (a preparation of opium with ipecacuanha:) but the author very much doubts whether either of these medicines, although excellent in human dysentery, is sufficiently powerful for cattle; and acknowledges that he gives the preference to calomel and simple opium.

In order that this mode of treatment may have a fair chance, the beast should be housed and fed on bran-mashes, a little hay, and plenty of well-boiled gruel. While the patient continues at grass the practitioner has no chance, however skilful in other respects his treatment may be. So much depends on the avoidance of all green and succulent food, that many a beast, from whom every symptom of dysentery had disappeared, has relapsed, and been lost, from having been turned out too soon. The green food of one day has produced irreparable mischief.

There are other auxiliary measures which deserve consideration. Setons in the dewlap have been strongly recommended. They may be useful when much fever accompanies the early stage of dysentery, for they will, in some measure, divert the current of blood from the inflamed and irritated part, and thus lessen the local inflammation and discharge, and also the general fever; but no very material degree of benefit can be expected from them; and there certainly cannot be that importance which is sometimes attached to the substance, or the root that is inserted. There is no peculiar virtue in the bearsfoot, on which so much superstitious confidence has been placed; the common cord, or hair-rope, will answer every purpose: the black hellebore root, however, produces the speediest inflammation and the most copious discharge.

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* Veterinarian, Sept. 1831, p. 511.

Fomentation of the right flank and the right side of the belly with hot water, or, in acute cases, the blistering of those parts will be far more serviceable than any seton in the dewlap can possibly be.

That admirable disinfectant, the chloride of lime, promises to be of essential service in the treatment of dysentery; not only in changing the nature of the intestinal discharge, and depriving it of all its putridity, but in disposing the surface of the intestine, with which it may be brought into contact, to assume a more healthy character. When applied externally to wounds and ulcers of every kind, it effects wonders in both of these respects; and, being properly diluted, it has not been found to give any great pain, or dangerously to increase inflammation in the most irritable ulcer. It may be administered either by the mouth, or in the form of clyster. The practitioner will probably avail himself of its aid in both forms. It should not be mingled with any other drug; but half an ounce of the solution, or a drachm of the powder, may be mixed with a quart of water, and given between the regular periods for the administration of the other remedies.

The reader will forgive a repetition of the caution as to the mode of administering liquid medicine to cattle; for in a disease so serious and so fatal as dysentery it cannot be too deeply impressed on the mind of the practitioner. Whether the medicine is given by means of the horn or the pump, it should flow as gently as possible down the gullet, that it may not break through the floor of the œsophagean canal, but have a better chance of passing on to the fourth stomach and the intestines.

In this, as well as in the chronic stage of dysentery, a great deal more depends upon attending to the comfort of the animal than too many seem to believe. The patient should be housed, and well littered down, and, in some cases, moderately clothed. Of his food, little portions at a time should be culled for him and offered to him; and warm gruel and warm mashes should be frequently put within his reach. The author will not go so far as J. E. (Ellman) in the Survey of Sussex, who, perhaps disgusted with the ignorance of the cowleech, and the recklessness with which he pours in his drugs, says, 'If any of my cattle get into a low, weak state, I generally recommend nursing, which, in most cases, is much better than a doctor; having often seen the beast much weakened, and the stomach relaxed, by throwing in a quantity of medicine injudiciously, and the animal lost; when, with good nursing, in all probability, it might have been otherwise;' but there can be no doubt that more benefit is connected with that one word *comfort*, than can be procured from half the drugs which the veterinary pharmacopœia contains.

In many cases, and in every case that can be brought to a successful termination, it will be observed, after the perseverance of ten days or a fortnight in this mode of treatment, that the pain preceding and accompanying the evacuations, is materially lessened, and that the nature of the matter evacuated is changed. The stools will probably be as frequent; they will be more copious; but less mucus will be found in them, and they will have become more decidedly fæcal and not so offensive. The belly will be less tender; the countenance less anxious; the general appearance improved. The inflammation of the inner surface of the large intestines will have materially subsided, but the habit of purgation will continue for a while, and will be increased by the state of relaxation and debility in which the vessels are left. Then, but not until then, astringents will be admissible and highly beneficial.

Catechu stands at the head of this class of medicines in such a case; and its power may be increased by the addition of oak bark, or it may be given in a decoction of oak bark. The opium must not, however, be omitted; for although direct inflammation may have been subdued, and relaxation and debility have followed, much irritability may remain, to control which the soothing power of opium will be required.

To catechu and opium it has been usual to add chalk; for in all these diseases there is a tendency in the stomach, and probably in the intestinal canal, to generate a considerable quantity of acid. A greater source of irritation can scarcely be imagined when the state of the lining membrane of the large intestine is taken into consideration. The chalk, or the carbonic acid of the chalk, will unite with and neutralize this acid, and render it harmless. Theoretic chemistry would lead to the substitution of magnesia for the chalk, for the carbonic acid being withdrawn, it might be feared that the caustic lime would be injurious; but experience has proved that magnesia is not so efficacious in cattle: that, in fact, it seems to be almost inert, while chalk has usually answered the purpose intended, and no inconvenience has resulted from it.*

Some practitioners strangely mingle vegetable and mineral tonics together, forgetful of the decomposition which frequently, or almost constantly ensues, and the impairment or total loss of medicinal power. Vegetable astringents agree best with the constitution of cattle, and they will not often deceive.

The nature of the disease, however, being considered, will the practitioner confine himself to the astringents? He has now to struggle with the consequences of inflammation—the weakness and want of tone which inflammation has produced, not only in the part itself but in the whole system. He will also take into consideration the natural temperament and constitution of horned cattle. Some physiologists speak rather unintelligibly of the prevalence of the lymphatic system in certain persons and animals; but the fact is that cattle will not bear disease, nor the treatment of disease like some other animals, and particularly as the horse will. Diseases speedily run their course in cattle, and the patients often sink under the prompt and vigorous and scientific treatment of the malady. An ox may bear one copious bleeding well; but he cannot be bled again and again as the horse may. He will derive the usual advantage from purgation to a certain extent, but care must be taken lest it degenerate into the disease which is now under consideration. The practitioner will therefore mingle stomachics, and probably tonics, with his astringents in this case. Here also he will find the best in the vegetable kingdom. Not only custom but experience of its beneficial effect has made ginger a necessary ingredient in almost every medicine, unless the animal evidently labours under fever. Gentian is an admirable tonic and stomachic; and if to these are added calumba and cascarilla, the veterinary surgeon has sufficient choice. The proportions of the different medicines will necessarily vary with the age and strength of the animal, and the character, duration, and ravages of the disease.

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* The author of the 'Survey of Dumfries' recommends 'an infusion of water trefoil, or the juice of the sloe.' Mr. Daniell speaks of 'a pint of dried box-leaves, rubbed small, and four ounces of madder, in a quart of milk.' In Nairn, some farmers give raw potatoes, mashed! and others give undried oats and barley, made into a kind of mash, with a handful of salt, and a portion of potatoes. Mr. Parkinson, in his 'Treatise on Live Stock,' (vol. i. p. 246,) says, 'I had a cow reduced so low by the flux in cattle called the *skit*, or rottenness, as scarcely to afford any milk, and I had had an eminent cow-doctor to her, who gave her up, and persuaded me that she must die, and advised me to send her to Smithfield, where she would sell for forty or fifty shillings, that being more than she would fetch when dead; and this doctor was recommended to me as one being particularly famous for curing this disorder; but I never knew a beast cured that was as bad as this cow. Knowing that almost all complaints arise from the stomach being in an improper state, I considered the case, and took the following method for cure:—I put about four ounces of chalk, beaten to a very fine powder, in one quart of the lees of red port, which I prefer, when they can be obtained: having mixed them well together, I gave it to the cow; and three doses, one every other day, effected the cure; for she came to her milk, calved, milked well, and afterwards made a good fat cow. I have since given it to two other cows, and it has had the desired effect.' There are worse prescriptions than this, yet a much better astringent might have been administered than the port wine lees, with the quantity of ardent spirit which they contain: besides, if port wine is to be given at all, it should be in its pure state, and not the accumulation of all the tartaric acid and extractive matter which it contains deposited in the lees.

Mr. Knowles improves upon Mr. Parkinson. After recommending a strange mixture of tormentil root, and bole armenian, and grains of paradise, and turmeric, and madder, and these to be given in oak-bark tea, for the cure of dysentery, he says, that 'red wine would be much better, or a pint of common brandy and a pint of water.' This for inflammation of the bowels—and shown to be of the most intense character by the mucus being discharged so abundantly, that, in his elegant language, the beast is 'parting with his puddings!'

Vegetable astringents and tonics having been fairly tried, and either not producing the desired effect, or beginning to lose their power, the mineral ones may be resorted to. The preference should undoubtedly be given to alum, and that in the common and very convenient form of alum whey. (See List of Medicines.) To this the usual quantity of ginger may be added without producing decomposition; and, if it should be deemed advisable, the opium may be continued. Should this not succeed, or not to the full extent that the practitioner wishes, blue vitriol (sulphate of copper) may be substituted; and to this the opium will be a necessary auxiliary. The dose should be about one drachm of the former and half a drachm of the latter. There is no other mineral astringent or tonic that can be depended on or safely given.

Clysters should not be neglected in this stage of the disease. With the assistance of the injection pump they promise to be as efficacious as any medicines that can be administered by the mouth, for they may be brought into immediate contact with the inflamed or ulcerated surface. Gruel may be made with a decoction of poppy-heads, as already recommended. To this may succeed an infusion of catechu, decoction of oak-bark, and with or without opium; and possibly a weak solution of alum or blue vitriol. The practitioner will here, however, proceed with considerable caution.

The malady being apparently subdued, there will be need for much caution in the after-treatment of the animal. He must not soon return altogether to green meat, and more especially not to luxuriant pasture. J. E., in the Survey of Sussex, speaking of the prevention of the first attack of diarrhœa and dysentery in working oxen, gives some excellent advice, which is applicable to all cattle, in order to guard against a recurrence of the disease. 'The best way to prevent this (diarrhœa) is to continue to give a small quantity of hay for some time after turning to grass, and not to keep them too many hours at a time from water. When I see it coming on I keep the ox as much as possible on hay and bran, and let him have water often in small quantities.'

For a long period after a severe attack of this complaint the animal will be subject to occasional diarrhœa, and will require careful management. The best thing to be done is to get him, as quickly as the state of his constitution will admit, into fair condition and sell him; but there will be some difficulty in accomplishing this, for abundance even of the most wholesome food will often be more than his debilitated powers of digestion can manage, and hoove, or diarrhœa, or dysentery will ensue. At the best, he will rarely be got beyond fair condition, and with that the farmer must be content. While the experience of the writer of this treatise furnishes him with various instances of permanent recovery from dysentery, it supplies him with but few cases in which the patient has 'afterwards grazed and fatted as well as any other beast.'

However perfect may seem to be the cure, the animal that has once been a decided *shooter* should never be bred from. There is a taint about him which will almost certainly be communicated to his stock. Dysentery is not only the pest of certain districts, and especially of cold and wet ones, but of certain breeds. The beautiful Dishly breed of long-horned cattle was swept away by it, when the master-mind of Bakewell no longer regulated the admirable, but (to the inexperienced agriculturist) dangerous system of breeding from near affinities; and there is reason to believe that many of the yet more valuable short-horned stock have been destroyed by it. The breeding too far, and too incautiously in and in, will produce a weakness of constitution that predisposes to dysentery; but, without insisting on this, the experience of many a farmer and many a dairyman will convince him, that the sooner he gets rid of a beast that has been a *scanterer* the better it will be for his stock.

One point more should, perhaps, be adverted to before this subject is dismissed—the supposed contagiousness of dysentery. There is a great deal of contradictory evidence with regard to the contagiousness of this complaint in the human being, and it would probably be deemed presumption in a veterinary surgeon to give an opinion on the subject; but of his own patients he may speak, and he would say that there is not the slightest reason for believing that the dysentery of cattle is contagious.

As the large intestines are the principal, and, in most cases, the only seat of that inflammation which is characterised by the term *dysentery*, other intestines are occasionally subject to maladies either peculiar to them, or in which the neighbouring viscera participate to a greater or less extent.

INFLAMMATION OF THE DUODENUM.

Examination after death has occasionally discovered an inflammatory affection almost confined to the duodenum, or first intestine. This occurred to the author in two varieties of jaundice. In the one there appeared to have been an undue secretion of bile; and this being received into the duodenum in its undiluted state, the mucous membrane of the whole of that viscus was inflamed. There were also spots of effused blood, and a small ulcer that seemed to have penetrated the mucous coat alone. In the other case there was considerable inflammation of the thickened substance that surrounds the orifice through which the bile enters this intestine, and which was probably produced by the continued presence and irritation of a gall-stone that had been here arrested in its progress. There were numerous red lines radiating in every direction. In both cases there was slight inflammation of the upper part of the jejunum.

In neither of these instances were there any peculiar or characteristic symptoms that would at once direct the attention of the practitioner to the duodenum as the chief or the only seat of disease; but in both there was a yellow skin—evident pain—fever and purging.

A history of this disease must be left to future observers.

COLIC.

Of this disease there are two varieties. The one is FLATULENT COLIC, arising from the distension of certain portions of the intestines, occasioned by the food contained in them undergoing a process of fermentation. The pain which the animal evidently suffers, his moanings, his striking at his belly with his hind feet, a swelling on the right side of the belly, the occasional discharge of gas from the mouth and anus, constant restlessness, continual getting up and lying down again immediately, and all this accompanied by fever, would induce the suspicion that the animal was labouring under flatulent colic.

There are various reasons, however, why cattle should seldom be subject to this complaint. By the maceration which the food undergoes in the paunch, and the second mastication to which it is subjected in rumination, it is prepared for speedy and perfect digestion; and little of the mechanism that has been admired in the horse for the detention of the food is to be found in cattle. There is neither time nor disposition in the substances contained in the intestinal canal for this process of fermentation to be set up; and if there were, there are no labyrinthian irregularities to detain the gas, but it would be readily pressed on by the common peristaltic motion of the bowels, and expelled. Spasmodic colic has sometimes been mistaken for that which has been occasioned by the distension of the bowels; or, more frequently, inflammation of the outer coat of the intestines (the *red colic* of the horse) has been confounded with *flatulent colic.*

This species of colic will generally be relieved by the administration of almost any aromatic drink; but the chloride of lime, as in hoove, is most to be depended upon. Two drachms of the chloride dissolved in a quart of warm water, to which an ounce of the tincture of ginger, (or two drachms of the powdered ginger,) and twenty drops of essence of peppermint have been added, will form one of the most effectual colic drinks that can be administered. The chlorine unites with the extricated hydrogen gas, and causes it, or the greater part of it, to disappear; while the aromatic stimulates the intestine to contract upon and force forward and expel any small portion that may remain.

The beast should be walked about: exercise alone will sometimes cause the gas to be expelled; but the owner must not adopt the dangerous expedient of driving or worrying the beast with dogs, otherwise he may produce strangulation, or *netting*, or rupture of the intestines.

Should the first dose, and gentle excercise for a quarter of an hour, not produce relief, a purgative drink should be given, and that of an aloetic nature as more likely to operate speedily. The mode of preparing this drink will be found in a note.* Clysters of warm water, or thin gruel, should not be neglected, and with each clyster two ounces of the aloetic tincture should be administered. Friction on the belly and flanks is occasionally useful, and, in obstinate cases, it will be advisable to stimulate the whole of the belly with spirit of turpentine well rubbed in. In very bad cases, but not until other remedies have been applied, it will be useful to bleed. Warm mashes, warm gruel, and good old hay, should constitute the food of the beast for some time afterwards.

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* Take of Barbadoes aloes four ounces, pimento powdered two ounces, and gum arabic two ounces; pour on them a quart of boiling water; stir the mixture well, and often; when it is cold add half a pint of spirit of wine, and bottle the whole for use: shake the bottle well before the requisite quantity is poured out.

A more prevalent species of colic, yet not so frequent in cattle as in the horse, is the SPASMODIC. It is spasm, or contraction of a portion or portions of the small intestines, and accompanied by more excruciating pain than the former. The animal is exceedingly uneasy, lowing, pawing, striking at his belly with his hind legs, or his horns; continually lying down and getting up, becoming very irritable, and sometimes being dangerous to handle. It is distinguished from flatulent colic by the smaller quantity of gas that is expelled, the comparative absence of tension or enlargement of the belly, the more evident spasms relaxing for a little while, and then returning with increased violence, and the freedom with which the animal moves during the remissions.

The feeding on acrid plants, or even on healthy food too great in quantity or too nutritive, the commencement of feeding on grains, exposure to cold after work, the drinking of too cold water, and especially after exercise, or of water impregnated with metallic salts, are occasional causes. More dangerous ones are the long continuance of purging, and also the long continuance of costiveness. The treatment will be the same, except that as this proceeds from irritation in the intestinal canal generally, or in particular portions of it, which is apt to run on to inflammation, bleeding will be earlier resorted to; and the practitioner will not suffer the first symptom of inflammation to appear without adopting the best method of subduing it. After every case of colic, whether flatulent or spasmodic, the animal will require some attention and nursing, for in both of them the intestines are considerably weakened and predisposed to a repetition of the attack, and there are few maladies, the habit of the recurrence of which is so soon formed.

STRANGULATION OF THE INTESTINES.

Spasmodic colic, if neglected, or bidding defiance to medical treatment, occasionally leads to such an entanglement of different parts of the bowels with each other that they become tied into a kind of knot, and the passage of food along them is obstructed. This is no unfrequent consequence of colic in the horse, and when the small intestines of cattle are observed hanging loose, as it were, at the end of the mesentery, (see fig. 2, p, 451,) it is not to be wondered at, if, in the disturbed, increased, hurried, and sometimes inverted peristaltic motion which takes place in consequence of colic, one portion of the intestine should be entangled among the rest, and the fatal knot should be tied. Occasionally a small piece of fatty matter disengages itself from the mesentery and hangs floating in the belly, and then, either in the changes of situation which the bowels undergo in natural exercise, or more particularly in the commotion of colic, it entwines itself round a portion of the intestine, and obstructs the passage. These twists, and loops, and knots, are sometimes strangely intricate. When the dead animal lies before the practitioner it is almost impossible to unravel them. This is the true *net* or *knot* so dreaded in some parts of the country. It is the result of those colicky pains which have been mistaken for strangulation, and which have been increased and hurried on to the production of this involved state by the absurd and brutal measures that have been adopted. Strangulation having once taken place, there is and can be no remedy. All that can be done is to attack every case of colic in good earnest, as soon as it is perceived, for no one can tell how soon the displacement, twist, knot, or whatever it be, will occur in consequence of the perverted action of the intestines, or the violent struggles of the animal, caused by the torture which he endures.

THE CORDS OR GUT TIE.

This is another singular and fatal species of intestinal strangulation that has lately been brought under notice by Mr. Corbet, of Simonborn.* It is not of unfrequent occurrence in some districts, and especially in wet and marshy situations: it is peculiar to the ox, and is rarely observed in him after the second or third year. The beast shows disinclination to food—rumination is suspended, or performed in a listless, interrupted manner—the animal appears to be griped—he strikes at his belly with his hind legs—he lies down, and as he gets up again bows his back in an extraordinary way, and then, all at once, stretching out every limb, he gives the spinal column a somewhat concave form. Small quantities of fæces are voided, mingled with mucus, and sometimes with blood; and if the animal is examined, by introducing the hand into the rectum, he evidently suffers extreme pain.

By degrees the ailment is referrible to one side more than the other, and generally to the left side. The hind leg on that side is frequently advanced and then retracted, and, in some cases, becomes partially paralysed.

These symptoms are more and more alarming—if the ox can be induced to eat, the griping pains are immediately increased—the belly swells—the countenance becomes anxious—the ears, the horns, the nose, and the thighs become cold—the pulse is small and accelerated, and scarcely to be felt—the breathing is laborious and heard at a distance—the mouth and nostrils are pale. The disease continues during six, seven, or eight days: it yields to no medicine—it is aggravated by most of the measures adopted—it is especially so if the beast is moved about—and at length death terminates the period of suffering.

On examination, strangulation of some part of the intestine is found, and generally of the small intestine. It is tied by a distinct and evident cord—in some cases it is the spermatic cord, which, after castration unskilfully performed, or now and then by mere accident, has been retracted into the belly, and has become enlarged, and has had tumours forming on it, and particularly at its extremity. Oftener it is an adventitious or unnaturally formed membrane, which becomes entangled round the intestine and assumes the appearance of a cord.

The mode of operation, in castrating bullocks, is often very absurd. Some practitioners pride themselves on performing it with scarcely the loss of any blood. They open the scrotum, and lay bare the spermatic cord, and then, by mere dint of pulling and twisting, they tear it out. There is, certainly, no bleeding, and the portion that remains immediately retracts into the belly; but the consequence of all this violence is that inflammation ensues—tumours, false membrane, are formed, and the foundation is laid for this complaint. Others draw the cord out as far as they can without tearing it, and then cut it off close to the pelvis. There is no external bleeding in this case; but there is bleeding within the cavity of the belly, and a source of irritation is set up by the presence of this blood, and various abdominal diseases ensue, and, among the rest, the *cords* or *gut tie*.

Mr. Dick, the talented professor of veterinary medicine at Edinburgh, to whom his own profession, and agriculturists in general, are deeply indebted, as a teacher of cattle medicine, gives a similar account of the cause of this disease. He says, 'This seems to be the effect of castrating the ox, by drawing out the cord or spermatic artery. The vessel, when torn asunder, recedes into the scrotum and up into the abdomen, and there producing inflammation, the formation of a new membrane is the consequence.'*

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* An account of this disease was published in the Repertory of Arts and Sciences, 1795, by Mr. Harris, a well-informed farmer in Herefordshire. It is said to have been very common in that county.

It is not, however, to be uniformly traced to this cause alone. It seems, especially, to prevail in low and damp situations—it has followed the use of half mouldy and unwholesome fodder—it has seemed to be connected with hard work, and that on an irregular or steep surface; and some have imagined that it is most prevalent where the floor of the ox stables is too much inclined, on account of the great pressure on this part of the abdomen, and especially in the act of rising. It can be readily believed that any source of irritation, whether of the spermatic cord, or of the intestines lying in the neighbourhood of it, or of the intestinal canal generally—in fact, that any, or all of the sources of common colic may be the predisposing, or immediate causes of this species of strangulation. If any circumstance, however, were to be selected as that to which the disease might be oftenest traced, it would be this unskilful mode of castration.†

Although it has been stated that no medicine seems to be of avail, the patient should not be abandoned. There is an operation, apparently difficult and dangerous, but really simple, easy to be performed, and generally effectual.

This operation is described, but somewhat unsatisfactorily, both by Mr. Harris and Mr. Corbet. The former had performed it on cattle from three months to nine years old. The following is the account of Mr. Corbet:—'The operation is begun by making an opening into the inside of the ox, beginning a little before the ileum. The arm is introduced, and, in general, the cord or ligament is easily felt, commencing a little behind the kidneys at the origin of the spermatic vessels, and attached to some part of the pelvis, and which appears to strangulate a portion of intestine. In some cases, I have found two ligaments, varying in size from a small quill to three times that magnitude. If operated upon early, the animal generally recovers without the aid of medicine.—I have known an animal remain five days, and I have then operated upon him, and the case has turned out successful.'‡

It will be evident that this operation should be performed, the side line being used, and the beast remaining standing close to a wall, and fastened to it as well as circumstances will permit. The incision should be made on the left side, and taking, as the centre of it, the spot at which the flank is generally punctured in cases of hoove, and where a small portion of the jejunum, and that which is the most likely to be entangled is protruded over the rumen, and floats by itself at the extremity of the mesentery. It should be a vertical incision, or a little oblique in a direction from behind forwards. A small opening should first be made, through the integument and muscle, avoiding, if possible, the peritoneum. Into this the first and second fingers of the left hand should be introduced, and thus, by means of a probe-pointed bistoury, guarded and guided by these fingers, the wound may be enlarged so as to permit the introduction of the hand of the operator. There will probably be a considerable gush of blood when the external oblique is first divided, but that will speedily cease by the retraction of the artery.

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* Veterinarian, May, 1834, p. 266. Mr. Harris's account of this entanglement is drawn too much from imagination, and is deficient in correctness of anatomical detail. He says, 'This stricture or gut-tie is occasioned by an erroneous method of castrating the calves, which the breeders practise throughout Herefordshire. They open the scrotum take hold of the testicles with their teeth, and tear them out with violence, by which means all the vessels belonging to the part are ruptured. The vasa deferentia, entering by the holes of the transverse and oblique muscles, pass over the ureters at acute angles, and turning, by their great length and elastic force the peritoneum is ruptured. The vas deferens is severed from the testicles, and, springing back, forms a kind of bur. The part of the gut that is tied by it is the jejunum, at its turning from the right side to the left, and the entanglement is generally effected by some sudden motion of the beast.' Rep. of Arts, 1795.

† A disease of this kind is very prevalent in Switzerland, and particularly in the canton of Bern. M. Anker, professor at the Veterinary School at Bern, has published a very satisfactory account of the symptoms and treatment of it, as furnished by his brother, a veterinary practitioner at Ins. (See *Practische Abhandlung des Veberwufes*, &c.) He attributes this entanglement to the spermatic cord, but he says little of the mode of castration, and dwells mostly on situation, and food, and stabling, and work among the steep mountains of Switzerland.

‡ Veterinarian, May, 1834, p. 265.

The peritoneum should next be divided, if it has not been so already, and the hand of the surgeon, the arm having been bared and well oiled, should be introduced into the wound; the epiploon or cawl gently torn; and the hand passed among the intestines in a direction upwards and backwards, or as Mr. Corbet describes it 'a little behind the kidneys.' The operator will soon feel the strangulated part, and the cord by which it is suspended or tied, and usually 'attached to some part of the pelvis.' Having satisfied himself with regard to the situation of *the cord*, he will withdraw his hand, and, taking another shorter and more curved and probe-pointed bistoury,* and having it in the hollow of his hand, and guarding the cutting edge with his finger and thumb, he will introduce it into the abdomen, find out the cord again, and cautiously divide it. The hand will once more be removed, in order to get rid of the bistoury, and then re-introduced to ascertain whether the whole of the strangulated part has been liberated, which is easily effected by tracing all the neighbouring circumvolutions and passing them through the hand.

The operator being satisfied as to the state of the bowels, brings the edges of the wound together, and confines them by a sufficient number of stitches, including the peritoneum, muscle, and integument, in the same stitch. A pledget of tow is placed over the wound, and a broad bandage passed tightly several times round the belly, which must not be removed during the first six or eight days.

The decided majority of cattle thus operated upon are saved, and the wound is usually healed in somewhat less than a month. It may, however, be supposed that after the extensive opening into the abdominal cavity, and this laceration of the cawl, and groping and cutting among the intestines, some alarming symptoms will occasionally supervene. The belly will swell, and sometimes to a considerable extent. Fomentations, and if necessary, scarifications may be resorted to. There may be manifest symptoms of fever, as shiverings, heaving at the flanks, and cessation of rumination. Blood should then be abstracted, according to the state of the patient; half-pound doses of Epsom salts should be given morning and night, until the bowels are moderately opened, and the beast should have little besides mashes and gruel, and should be kept as quiet as possible.

INTROSUSCEPTION OF THE BOWELS.

This is another fatal consequence of colic. While certain portions of the ileum or jejunum generally, but occasionally of the larger bowels, are distended by gas, other parts are spasmodically contracted, and then, by the increased peristaltic motion which is going on, the collapsed part of the superior or anterior intestine slides, or is forced down, into the distended part behind; or, by that inverted action which takes place in the intestine commotion of colic, a contracted portion of the bowel slides or is forced into the distended part before, and thus one intestine is strangely contained within another, and that occasionally reaching to a considerable extent. The mesentery is usually torn in this unnatural procedure, for otherwise that too must be taken up or carried down into the distended intestine above or below.

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* Mr. Harris describes the knife as being of the form of a large fish-hook, with a cutting edge on the concave side.

It will be easily conceived that this will inflict great torture on the beast, and an examination after death will sufficiently prove the intensity of the suffering; for there will be much inflammation, and generally gangrene of the involved part; and sometimes of both portions of the intestine. The symptoms by which the practitioner may be induced to suspect, or may know that colic has run on to introsusception, are not yet determined. Increase of pain, attended by obstinate constipation, rapid prostration of strength, and comparatively little fever, may be obscure indications. It is evident that this case must be beyond the reach of medical skill. The most powerful purgatives, the crude mercury, the shot, the living trout of some practitioners,* must be useless; a knowledge of the anatomy of the stomachs, however, should have taught these men, that the shot, and the mercury, and the trout would necessarily have found their way into the rumen, where they could not possibly have produced any good effect.

Mr. Cartwright furnishes the only case on record of the occurrence of introsusception in cattle. He saw a bull-calf six days old, that appeared to be in pain. It was continually lifting its head towards its belly; it discharged some blood from the anus, and it would not suck. Being at some distance from home, he gave it two ounces of Glauber's salts, and two table-spoonsful of common gin in a pint of the cow's milk. In the evening it was worse; it was almost continually down; it shifted its legs towards its belly; it continued to discharge blood in small quantities; and the pulse was quickened. He ordered it to be drenched with new milk.

On the following day, it was weaker; it could not stand; it breathed very quickly and laboriously; but the discharge of blood had ceased. The pulse could scarcely be felt, and no vein could be raised in order to abstract blood. Six ounces of Glauber's salts were given, but the calf died in the afternoon.

On examination after death, the rectum was found to be hard and distended; it presented both strangulation and introsusception, for one portion of intestine was contained within another, with its coats much thickened and black, and in a completely gangrenous state.†

The case-book of the writer of this treatise furnishes him with a more extraordinary and decisive case. It was an old and rather overworked ox. The beast had performed its task well three days before. That day was cold and wet, but the animal fed as usual on his return, and there was no indication of illness. On the following morning, however, there were evident symptoms of colic; the ox was in great agony. Antispasmodics, stimulants, and purgatives were freely administered, and twelve pounds of blood were abstracted. The animal at length obtained some relief; he lay down; he occasionally looked at his right flank; he struck it with his horn; he moaned; but there was not so much expression of intense agony. The bowels were obstinately costive, although four pounds of Epsom salts had been given and a drachm of the farina of the croton nut, and numerous injections had been administered. At length purging came on, and was exceedingly violent; the beast then got up; it staggered listlessly along; it now and then looked at its side; it began at long intervals and half unconsciously to ruminate; and it drunk some gruel. On the second day of the purging, the animal strained considerably, and a black substance was observed to protrude and hang from the anus. It was evidently a portion of intestine. There had been introsusception, and this was the involved part, which had become gangrenous, and had separated and passed away.

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* A pupil of Mr. D. was consulted respecting an ox labouring under constipation of the bowels. The disease proved obstinate; it resisted every remedy adopted, and the case was abandoned as utterly hopeless. At this stage of the business the old-established leech of the district stepped in, and confidently engaged to set matters to rights. He commenced with no less active a remedy than a lively trout, transferred from the river to the stomach of the patient, with the conviction that his agent would thread his way through all the mazes of the intestines; and he ascribed the failure of so notable a dose to the previous mismanagement of the Edinburgh student.—*Quarterly Journal of Agriculture.*

† Veterinarian, February, 1829, p. 71.

It was some time before the ox fully recovered his usual health and appetite, but he was sent to the market, six months afterwards, in fair condition.

INVERSION OF THE RECTUM.

It has occasionally happened in the straining of diarrhœa, and in the still more violent efforts with which the fæces are expelled in dysentery, that a portion of the rectum is protruded from the anus; the sphincter muscle of the anus then contracts violently upon it, and no effort of the animal can draw it back, nor will it readily yield to any external force employed. The blood is necessarily congested in the protruded intestine, from the situation of the part; the gut is intensely red, and it gradually becomes livid, black, gangrenous. The animal all the while is making frequent and violent efforts, during which small quantities of excrement, or mucus, or blood, or gas, are extricated; the protrusion of the gut increases; irritative fever ensues; and death speedily follows.

Internally, in order to allay irritation, and in some measure lessen these efforts by which more of the intestine is expelled or its return prevented, a pint of castor oil with two drachms of opium should be administered; and a quantity of blood, varying with the size and condition of the animal, abstracted. The protruded part should be thoroughly cleaned, and diligently fomented, during the space of an hour with a decoction of poppy-heads, lukewarm. Gentle, but long-continued efforts should then be made to return the intestine, which will be accomplished much oftener than would be imagined if the operator will have patience enough. The gut having been returned, cold water should be applied around the anus, and for a considerable time, in order that the sphincter muscle may more powerfully close, and confine the intestine in its proper situation. It may, however, again protrude, but it should be immediately returned, and, care having been taken to allay the irritation of the bowels and of the system generally, the straining will gradually cease, and the intestine will no longer be forced out.

If the protrusion continues in despite of every effort, and the part begins to swell, and to become black, and fœtid, and mortified, and the pulse is small, and the mouth hot, and the ears cold, and the muzzle dry, and the eyes red, and the appetite and rumination are suspended, and the animal is rapidly becoming weak, the practitioner must have recourse to a bold and dangerous operation, but which will succeed much oftener than it will fail; he must cut off the protruded intestine close to the anus. There will probably be considerable hæmorrhage, but he must not be alarmed at that; it will be beneficial rather than injurious; it will prevent or abate inflammation, and it will cease long before the strength of the patient is exhausted. The little portion of intestine half protruded at the anus will gradually return; the sphincter muscle will contract; union of the divided portion of the intestine will take place, and the animal will perfectly recover.

CONSTIPATION.

The immediate cause of many of these affections of the bowels is constipation. The beast is *sapped* or *bound*. This constipation is often exceedingly difficult to remove, not, perhaps, from any want of power in the intestinal canal to be acted upon by purgative medicines, but from the impossibility of getting any considerable proportion of the purgative into contact with the internal surface of the bowels. It has already been observed that in a state of health much of the fluid swallowed by cattle enters into the rumen, and is detained there for the purpose of macerating the food and preparing it for rumination; and we have proof, and that sufficiently annoying, that in some circumstances of disease, all the fluid swallowed goes into the rumen, and is lost so far as the purpose for which it was administered is concerned.

Mr. Simonds relates a case in which a heifer had been feverish, and had refused all food during five days; and four pounds of Epsom salts, and the same quantity of treacle, and three-fourths of a pint of castor oil, and numerous injections had been administered before any purgative effect could be produced.* It has not unfrequently happened that six, seven, and eight days have passed, and the bowels have remained in a constipated state.

This must of necessity aggravate the symptoms of many diseases, and lay the foundation for others, and among the rest, for those to the consideration of which the few last pages have been devoted.

The method of proceeding in such cases is sufficiently evident. When the state of the animal indicates the administration of the Epsom salts, they should be accompanied by the usual quantity of some aromatic, (half an ounce of ginger,) and be given in as gentle a way as possible. There can scarcely be a better way than suffering it to run from a long narrow-necked bottle introduced into the mouth. Should not this operate at the expected time, a second dose should be given, and probably, with the same quantity of the aromatic; certainly so if little fever is present. If this, however, should have no effect, it is very probable that from some sympathetic influence extending over the whole of the digestive organs, the roof of the rumen is open, or the pillars of which that roof is composed are in a relaxed state, and yield even to the pressure of a fluid gently poured down the gullet. Then the next dose (for the purgative must be continued until it does operate, and the nature of that purgative, and the knowledge of the manner in which the quantity already given has been disposed of, remove all fear of inflammation or superpurgation being produced) must have an increased proportion of aromatic, increased in defiance of existing fever, and increased to the full extent to which the practitioner dares to go. Probably, a cordial-drink (an ounce of ginger and the same quantity of carraway powder) would be given with advantage; for the rumen might be roused to its natural action by the stimulus, and the pillars of its roof might be closed, and the next dose might run on through the manyplus into the abomasum. The rumen may possibly be roused to act in another way; a portion of the fluid that it contains may be injected into the œsophagean canal by a process somewhat resembling that by which the pellet of food is thrown there for remastication; and the muscles of that canal, and of the base of the gullet, not being able to grasp it because it is a fluid, it will necessarily pass on through the manyplus into the fourth stomach and intestines. It has been stated that there are other ways in which the rumen may be excited to act, viz. when, although comparatively rarely, the contents of that stomach, instead of being returned, pellet after pellet, are thrown in great quantities into the œsophagean canal, and conveyed to the mouth by a process similar to that of vomiting; and, more frequently, when, although they are still ejected from the stomach in considerable quantities, the muscles of the œsophagean canal, and of the gullet, do not lend their aid to effect their expulsion through the mouth; and, consequently, a passage being denied them through the gullet, they are driven through the base of the manyplus, and are recognised in the dung by their fibrous character.

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* Veterinarian, Sept. 1829, p. 357.

It is by some mechanism of one of these kinds that purging is at length established after obstinate cases of constipation; or, when the animal dies and almost all the purgative medicine that has been given is found in the rumen, it is because that stomach has not been sufficiently stimulated. There is something in the structure of cattle which renders certain medical rules and principles altogether inapplicable, and which, in defiance of all fever, occasionally compels us to mingle strange doses of aromatics and stimulants with the very means by which we are endeavouring to subdue inflammation. This is a very important consideration in the treatment of disease, and the profession owes much to Mr. Friend for having first directed their attention to it: although it should be stated, in justice to the lecturer on veterinary medicine in the University of London, that it was a doctrine which he had long inculcated on his pupils.

CALCULI.

It has been stated (pp. 434 and 435) that various concretions are found in the rumen of cattle. It is the natural situation for them, for there the food is longest detained, and there they have time to form, as in the colon and cæcum of the horse. A few, but much smaller calculi, are occasionally found in the reticulum; others, composed of thin and friable concentric layers, occupy, yet comparatively rarely the large intestines of cattle; but they also are not of great size, for the food passes too rapidly over the smooth surface of these portions of the digestive canal. There are no symptoms by which their presence can be recognised, nor is there any evidence of their being the cause of disease, although it is not improbable that the presence and pressure of these bodies, and the irritation produced by them, may in some instances be the cause of colic, strangulation, and other serious affections.

WORMS.

These occasionally are found in the intestines of cattle, but in no great quantities; nor are there any authenticated accounts of their being the cause of irritation or disease. The food is so perfectly prepared for digestion, and that process is so rapidly accomplished, and the nutriment is so completely extracted, that there is little left for the support of worms; nor, if they are received into the intestines in the state of ova, or eggs, would they be likely to escape the processes of digestion which take place in cattle.

The *Amphistoma conicum*, a worm with a mouth, or the appearance of one, at each end, and often found plentifully in the intestines of birds, frequently inhabits the rumen and reticulum of cattle. It is here of considerably larger size, and swells into a somewhat conical form.

The *Tænia denticulata*, the denticulated tape-worm, small in size, and the neck becoming fine, and sometimes almost thread-like, is found in the fourth stomach, and in the small intestines.

The *Lumbricus teres*, the common intestinal round worm, and fully as large as in the horse, lives in the small intestines.

A small species of the *Strongylus* is a frequent companion of the last; and another small long worm, the *Tricocephalus affinis*, with its minute head attached to its lengthened and thread-like neck, has been discovered in the cæcum.

The presence of these worms is rarely taken into account by the practitioner, and few means are taken for their expulsion.

Mention has already been made of the hydatid (*Cænurus cerebralis*,) inhabiting the brain; and others (*Cysticerci tenuicolles*) found in the liver, the lungs, the spleen, and in the peritoneum and the pleura; the *Strongylus filaris*, occupying the bronchial tubes of cattle, and the *Distoma hepaticum*, the *fluke worm*, swimming in the biliary ducts.

DROPSY.

This is an accumulation of fluid in the cavity of the belly. The whole of that cavity is lined with, and every viscus which it contains is covered by, a polished, glistening membrane, so that the contents of the abdomen may glide over and move easily among each other, and the injurious effects of friction be as much as possible avoided. In a state of health there are certain vessels which continually secrete or pour out the fluid that is requisite for this purpose, and which are called *exhalent* vessels; and there are others that take this fluid up and carry it into the circulation when it has discharged its duty, or when it is secreted in undue quantities, and which are denominated *absorbent* vessels. Dropsy, then, is the consequence of the pouring out of an undue quantity of fluid, and faster than the absorbents can carry it away; or it is the pouring out of the natural quantity while the absorbents are paralysed, or do not do their duty in removing it; and in either way it accumulates in the abdomen. It is easy, therefore, to suppose, that when the lining membrane generally, or a portion of it, is inflamed, and a greater quantity of blood than usual is determined to that part, the secretion from the exhalent vessels will be increased; and in consequence of this there will be accumulation of fluid in the bag of the heart, when that organ, or its investing membrane, is inflamed; dropsy in the chest will be the consequence of pleurisy, and dropsy of the abdomen that of inflammation of the peritoneal membrane generally, or of any part of it. Chronic inflammation of the liver or spleen, or of any particular portion of the intestinal canal, will have the same termination from increased action of the exhalents; a similar effect will occasionally be produced by the sudden stopping of any long-continued evacuation; or acute or chronic eruption; and on the other hand, feeding in low, marshy situations; the privation of wholesome aliment, and every cause of general debility, will produce an accumulation of fluid from loss of power in the absorbents.*

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* The luminous description of the cause of dropsy given by Mr. Knowlson is here subjoined. When a person who has 'been fifty-seven years in full business' can write so nonsensically, the knowledge of cattle medicine must be at a low ebb.

'It is a stoppage in the gall-pipes which lead from the gall to the bladder, and enter the neck of the bladder, from whence there is a passage between two skins to the bottom, Of acute dropsy the practitioner has occasional examples. A beast, apparently well on the preceding day, suddenly exhibits manifest symptoms of inflammation of the bowels. The disease proceeds in defiance of all medical treatment, and in two or three days the patient is lost. On examination after death, the traces of inflammation of the peritoneum are sufficiently evident; there is deposition of flocculent matter; there are adhesions, but, most important of all, the belly is filled with clear, or turbid, or bloody fluid, and the death of the animal was as much occasioned by the irritation produced by the pressure of this fluid, and the labour of breathing which it occasioned, as by the previous or still-existing inflammation.

Of chronic dropsy, or a slower filling of the belly, he has more frequent proof. The beast increases slowly in size; it is an enlargement, not of the left side as in hoove, or of the right as in flatulent colic, but of the belly generally, and sometimes almost as slow as in the increase of condition. It evidently is not that, for the limbs are wasting, or if they occasionally increase in size, it is a puffy œdematous enlargement, and not the honest accumulation of flesh and fat. The animal at the same time is dull; disinclined to move; the skin is dry; the coat is rough; the thirst is excessive; there is alternate constipation and diarrhœa; the membranes of the mouth and nose are pale, and the conjunctiva is of a faint yellow. By degrees the belly drops, and leaves a considerable hollow at the flanks, and by tapping on the sides the evident fluctuation of water can be perceived. The pressure of the fluid on the diaphragm lessens the cavity of the chest, and does not leave sufficient room for the lungs to expand—labour of breathing ensues—it increases; the animal is not able to stand long, and when he lies down the respiration is so difficult, and the feeling of suffocation is so strong, that he scrambles up again as quickly as his remaining strength will permit, and at length dies either of absolute suffocation, or mere debility.

The chance of success in the treatment of such a disease must be little. The first object is to relieve the sad oppression under which the animal labours, and that must be effected by puncturing the belly, and suffering the fluid to escape. There is neither art nor danger about the operation. The beast should be tied up close, and a side line put on;* a puncture should be made with a lancet or trocar under the belly, six or eight inches from the udder, and half as much from the middle line of the belly, and on the right side—the milk vein and the artery which accompanies it being carefully avoided. The opening should not be larger than would admit the little finger; and if it is made with the trocar, the canula may be left in the wound until the fluid has quite run out.

The wound being thus small, there is no need for the often fruitless care to close it again with adhesive plaster when the purpose for which it was made has been effected. There will not only be no danger, but manifest advantage, in a small drain of this kind being left open; for the fluid which

before it enters the bladder. When the pipes are too much forced, or stopped by glueish matter, the urine cannot find a free passage, but oozes out, and in time fills the beast's body.'—*Knowlson's Complete Cow-Leech or Cattle Doctor*, p. 65.

* Many veterinary surgeons prefer to cast the beast; but rupture of the diaphragm has followed the violent struggle which generally occurs in casting, and especially when there was previously so much pressure on that part by the accumulated fluid. The distress of the dropsical animal is frequently extreme after it is thrown, not only on account of the respiration being hurried, but the additional pressure on the lungs when the patient is lying down. There is not the supposed danger of wounding the intestines while the animal is standing, for they are floating loose in the fluid, and recede before the instrument; while there is this advantage in the standing position, that the fluid drains away to almost the last drop.

may continue to be secreted will dribble away during two or three days, and thus permit the peritoneal membrane and the abdominal viscera (freed from the oppression around them) to recover their healthy tone: whereas if the wound is immediately closed, the fluid of dropsy will begin at once to accumulate again, and there will be far less chance of effecting permanent benefit. The quantity of fluid that is sometimes got rid of by means of this operation is very great. Mr. Wright, of Burnham Overy, told the author that he once took away twenty-seven gallons at one time, and ten gallons more from the same cow a little while afterwards. It is by no means uncommon for twenty gallons to escape, and there are records of thirty-two gallons having been drawn at once. There is little chance of permanent cure in cases like these, for there must have been great disease and disorganization in order to produce effusion to this extent, and that disease must have been of long standing, and therefore not easy to be removed. In addition to this, all the viscera of the abdomen must have been debilitated, and have lost their natural tone and function by the continued pressure and maceration. Still a cure is worth attempting, for the practitioner has done little by the mere temporary relief which the operation has afforded.

In order to prevent the refilling of the belly two objects must be accomplished, namely, the determination of this fluid to some other part where it shall be regularly discharged, and the restoration of the general health of the animal, and, with this, the proper balance between the exhalent and absorbent vessels. It is therefore usual to give a dose of physick immediately after the operation, that the fluid which might otherwise begin again to fill in the belly may be carried off by the discharge thus established; the physic is repeated as frequently as the strength of the animal will permit. This is a way of proceeding, however, not very favourable to the re-establishment of health and strength, and therefore greater reliance is placed on a course of diuretic medicine, with which tonics can be combined; purgative medicine being still occasionally given. Half an ounce of nitre, with a quarter of an ounce each of tartrate of iron, common liquid turpentine, gentian and ginger, may be given daily with great advantage. Bran and malt mashes will be useful at first, and when the beast goes again to grass, care should be taken that the pasture is good, but not too luxuriant or rank. Mr. Tait, of Portsoy, N. B., operated on a cow that was dropsical; eight gallons of fluid escaped. The cow seemed to be faint when she got up; and, in general, some weakness and disinclination to food will remain two or three days after the operation, attended at first by considerable heaving, and apparent distress, for it is a great change from the tumid and overloaded belly to the perfectly free and natural state of its contents, and which do not at once accommodate themselves to that change. He gave her a dose of physic consisting of Epsom salts with ginger, and commenced a course of nitre in doses of half an ounce. The animal became 'quite well again.'*

This was a favourable case, and the quantity of fluid evacuated was comparatively small; but the belly so frequently fills again after the lapse of two or three weeks, that it will be prudent to part with a cow that has been dropsical as soon as she can be got into tolerable condition. The exhibition of diuretic and tonic medicines will, perhaps, stave off the return of the disease until this can be accomplished; but the organs of digestion have been so debilitated, and these exhalent and absorbent vessels have been so habituated to an unnatural action, that a perfect and permanent restoration to health can seldom be expected. A second operation may be attempted if the belly has filled again, but the chances of success are then most materially diminished.

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* Veterinarian, Feb. 1833, p. 78.

There is scarcely a book on cattle medicine in which, if this disease is mentioned at all, there is not strict caution that the beast should not have too much water. This is altogether erroneous. The object to be accomplished is to restore the animal as nearly as possible to a state of health; and this can never be effected by curtailing the proportion of fluid that is necessary for the maceration and digestion of the food, and the supply of all the secretions. A state of unnatural thirst and fever would, on the contrary, be induced, which would weaken the animal, and dispose it for a recurrence of the disease.

HERNIA, OR RUPTURE.

A portion of the intestine occasionally protrudes through the walls of the abdomen. This may be the consequence of external violence, the beast having been gored by one of its companions. The external wound may probably be small, or, in some cases, the skin may not be broken at all, but the internal wall of the belly is injured, and partially or entirely ruptured. In consequence of this a tumour soon appears, varying in size according to the extent of the injury. It is a portion of the intestine that is protruding. The enlargement is tender when pressed upon, but it does not seem to interfere with the health of the animal, and a fortnight or three weeks elapse before any serious consequence is observed: at length the tumour begins to increase very rapidly; the animal expresses considerable pain on being moved, and is only comparatively easy when lying down, and even then it moans occasionally; the breathing is quickened; the countenance is anxious; the pulse is quick and small; rumination has stopped, and the usual evacuation of fæces is diminished. It is plainly a protrusion of the bowels, and now attended with some degree of strangulation, or pressure of the edges of the wound upon them and thus obstructing the passage of their contents. The tumour is generally soft and yielding, and, on pressure, a gurgling noise is heard within it. On inspection of the cut, p. 467, and observation of the loose manner in which the small intestines are attached to the edge of the mesentery, it will be easy to account for the occasional enormous size of the tumour, and the quantity of intestine which is protruded.

It is rarely possible, by any manipulation (*taxis*), to return the bowel; and if it could be returned, it would immediately escape again. It is therefore loss of time to endeavour thus to treat the case. It would be worse than loss of time, for considerable inflammation may be set up by a long-continued and rough handling of the part.

The beast must be thrown and held on his back, with the hind parts somewhat elevated. An incision must be made through the skin corresponding with the length of the tumour, especial care being taken that the protruded intestine, which will be found immediately underneath, is not wounded. Then, if there is any strangulation of the intestine, which in most cases there will be, the first and second fingers of the left hand must be introduced between the bowel and the edge of the wound; a crooked knife (a bistoury) must next be passed cautiously between the fingers, and the wound enlarged sufficiently to enable the protruded mass to be returned. The bowel having been thus replaced in its natural cavity, the edges of the wound through the walls of the belly must be brought together and retained with stitches, the skin, if necessary, being dissected back a little in order to get at the whole of the wound. Stitches must then be passed through the skin, the divided edges of which should be brought together in the same manner. In a few cases it will be practicable, and always advisable when practicable, to include the skin and the muscular wall of the belly in the same stitch. A pledget of fine tow must be placed over the incision, and upon that another pledget smeared with simple ointment. This must be confined by a bandage five or six inches wider than the wound, and which must be passed twice or thrice round the body, firmly sewed, and, if possible, not removed for ten days. At the expiration of that period the edges will be found to have adhered along the greater part of the incision, the stitches may be withdrawn, and what remains unhealed may be treated as a common wound. Should much œdematous swelling appear on either side of the bandage, the parts should be well fomented with warm water, or, if requisite, lightly scarified. The beast should be kept on rather short allowance, the food consisting chiefly of mashes, with a little hay or green meat, and a dose or two of physic should be given during the progress of the cure.

If the horn should have broken the skin, as well as lacerated the muscular part beneath, and the intestine protrudes, it must be cleared from any dirt or extraneous matter about it, then carefully returned, and the wound closed and the bandage applied as already directed.

The author has not only seen a considerable portion of bowel protruding, but the bowel itself torn. Even then he has not despaired, for the healing power in these animals is such as the human surgeon would scarcely deem possible. The rent of the intestine may be closed by a stitch or two, with well-founded hope of the edges uniting, and the intestinal canal becoming perfect and whole.*

Calves are occasionally dropped with ruptures. They principally occur along the middle line of the belly, and not far from the navel. It is usually a protrusion of a portion of the omentum or caul; but in a few instances one or two small convolutions of the intestines have been involved. The principal danger is that the rumen, when unnaturally distended by food or gas, may press upon and injure the portion of caul or intestine immediately within the abdomen, and turning over the edge of the opening.

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* Dr. Cheselden relates a very extraordinary case of this healing power, and does not forbid hope, although the intestines may have been injured to a very great extent. 'An ox,' he says, 'was suffering under constipation of the bowels. Thomas Brayer, a doctor for cattle, opened the ox in the flank, and took out great part of his bowels; upon searching which he found there was a perfect stoppage in the guts, and the gut was, about the stoppage, putrified for three quarters of a yard, whereupon he cut off so much of the gut as was putrefied, and took it quite away, and then drew the ends of the guts which remained sound, after what was cut off, together upon a hollow keck, which was about three or four inches long, and sewed the said ends of the guts together upon the said keck, leaving the keck within the guts, and then sewed up the hole cut in the hide upon the flank of the said ox. Within the space of one hour after this operation was performed, the ox dunged, and the piece of the keck which the said ends of the gut were sewn upon, came away from the ox with the dung, whereupon the ox recovered, and lived to do the owner service several years.'

Mr. Thomson, of Beith, relates a similar case in the pig. He was castrating one, and he says, 'having laid the animal on a table, and while I was in he act of cutting through the peritoneum one of the assistants lost his hold; the pig sprung up, and the scalpel was plunged deep into the belly. I proceeded to extract the testicles, but saw that some of the intestines were wounded, as fæces were escaping from the opening in the side. The greater part of the small intestines had to be drawn out through the opening before the injury could be discovered. The knife had entered deep among tho convolutions of the ileum, and divided one of the guts almost through, and it had also made a considerable wound in the mesentery. A fine needle and thread were immediately procured; the gut and mesentery were nicely adjusted and sewn together, and returned into the belly; the side was secured by stitches, and the pig was liberated. I had not much hope of success in this case, but the healing power in the swine appears to be strong, for in two days afterwards little appeared to be the matter, and the animal soon completely recovered.'—*Veterinarian*, March, 1834, p. 149.

Any serious operation with a view to the reduction of the rupture would scarcely be advisable, but it would be prudent to fatten and dispose of the animal as soon as convenient.

Bull calves are sometimes born with rupture in the groin. The opening through which the testicle afterwards descends into the bag is lax, and yields to slight pressure, and in the motions of the fœtus in the womb, a small convolution of the intestine slips down. This sometimes continues of nearly its original size for several months; in some cases it is gradually retracted, and disappears; in others, it increases in volume with greater or less rapidity. A remedy is often to be found for this as soon as the testicles descend into the bag; and at which time, if the hernia will ever be serious, it begins to increase, or to be strangulated—the beast should be castrated.

After the animal is thrown and properly confined, the protruded intestine should be gently and carefully pushed up through the ring or opening, the testicle being somewhet drawn out, in order to render this more practicable. Continued and gentle pressure applied on the sides of the tumour will more facilitate this than the application of the greatest force. The intestine having been returned, the finger of an assistant is placed at the opening, and the operator proceeds to cut into the scrotum as quickly as he can, and to denude the testicle, to apply the clams, (which will he hereafter described,) and to divide the cord. The clams will form a temporary and effectual support; and by the following day, when it is usual to remove the clams, a degree of inflammation and engorgement of the parts will have been set up, that will either obliterate the ring, or so far contract it, that it will be impossible for the gut afterwards to descend.

There is one circumstance to which the practitioner should most carefully attend. The protruded intestine always carries with it a portion of peritoneum—it is contained in a bag formed by the investing membrane of the bowels. The whole of this bag may not have been returned when the intestine is pushed up: the operator must ascertain this, and by no means open any part of the peritoneal covering that may remain.

Castration will usually remove this hernia and all its unpleasant or dangerous consequences, and the beast will be as valuable for grazing and for working as if nothing had occurred.

In a few cases, however, the hernia will be strangulated. So great a portion of intestine, or of fæcal matter in that intestine, will have descended, that the operator cannot return it through the abdominal ring. Even the somewhat desperate expedient of introducing the hand into the rectum, and endeavouring to find out the portion of intestine connected with that which has descended and forcibly retract it, may fail: a different kind of operation must then be attempted, and which a skilful veterinarian alone can perform.

A species of rupture, very difficult to be treated, has occurred to cows in an advanced period of pregnancy. An excessive accumulation of fluid has taken place in the womb, or calf-bed, and the tendinous expansion of the muscles which support the lower part of the belly has given way. The farmer says, that 'the rim of the cow's belly is ruptured.' A portion of the womb escapes through the opening, and descends into the groin, or seems to occupy the udder. Mr. Allinson, of Idle, relates a case,* in which the head of a calf had been forced down into the groin. The calf was extracted with no great difficulty, but the bowels then descended through the rupture into the place that had been occupied by the fœtus, and the animal was irrecoverably lost.

There is one more species of rupture to which cattle are subject, and the existence of which cannot always be ascertained during life, namely, that of the diaphragm, or midriff. In distention of the rumen there is always great pressure against the midriff. This is increased when severe colicky pains come on, and especially when improper means have been resorted to, such as strong stimulating drinks, or rude exercise, or when the animal, in a state of half-unconsciousness, has violently beaten himself about. The midriff has then given way, and a portion of the intestine, or of one of the stomachs, or of the omentum or caul, or of the liver, has been forced into the cavity of the chest. This may be suspected when, after the usual symptoms of hoove or colic, great difficulty of breathing suddenly comes on, and is evidently attended by excessive pain—when the animal is every moment looking at her side, and especially at the left side—when she shrinks, and bows herself up as if the muscles of the belly were violently cramped—and when she stiffens all over, and then suddenly falls and dies in convulsions.

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* Veterinarian, October, 1831, p. 555.

Examination after death has sometimes displayed chronic rupture of this kind. The attack has been as sudden, but the colicky pains have not been so violent; they have intermitted—disappeared; but an habitual difficulty of breathing has been left behind—disinclination to rapid motion—fright when suddenly moved—anxiety of countenance—perhaps impairment of condition—and certainly impossibility of acquiring any considerable degree of condition. This has continued during several months, until the animal has been destroyed, or has died from some cause unconnected with these symptoms; and then an old rupture of the diaphragm has been discovered, the edges of which had been completely healed, and the second stomach, or the liver, had been firmly placed against the opening, and had occupied it, and in a slight degree projected into the thorax. No medical treatment or operation could be of the slightest service in this case.

CHAPTER XIV.

THE URINARY ORGANS AND THEIR DISEASES.

THE KIDNEYS.

THE blood contains much watery fluid, which, after it has answered certain purposes connected with digestion, or the various secretions, is separated and carried out of the frame. The kidneys are the main instruments by which this is effected; and they are often called into increased action in order to compensate for the deficiencies of other parts. When the usual discharge of perspiration from the skin is suspended, the kidney takes on increased activity; and when fluids are accumulating in the frame generally, or in particular parts, they escape by means of these organs. Also other substances, the accumulation or the continuance of which in the frame would be injurious, are got rid of by means of the kidneys. The essential principle of the urine (the *urea*) is one that would be noxious, or perhaps destructive.

The kidneys are two glandular substances attached on either side to the spine beneath the muscles of the loins. They are not, however, exactly opposite to each other, but the left kidney is pushed somewhat backward by the great development of the rumen. A very large artery runs to each. The quantity of blood which that vessel carries shows the importance of the kidneys, and well accounts for the inflammation and other diseases to which they are occasionally subject. These arteries divide into innumerable little branches, coiled upon and communicating with each other in a singular manner; and the blood, traversing all these convolutions, has its watery and noxious ingredients separated in the form of urine which is carried on to the bladder, while the portion that remains is returned to the circulation by means of the veins, which bear a proportionate size to that of the arteries.

As the process of digestion is so much more perfectly performed in cattle than in the horse, and all the nutritive, and some perhaps of the noxious matter which the food contains, is taken up and received into the circulation, the kidneys have more to do in order to complete this process of separation; they are therefore of considerably greater size in cattle than in the horse; they are more complicated in their appearance; they present an assemblage of different lobes or lobules, separated by deep scissures; there are additional provisions made for their security—they are deeply embedded in a covering of fat, and there is another accumulation of fat surrounding and defending the different vessels that are received or given off. The bulk of the rumen, and the danger of occasional pressure from it, may in some degree account for these provisions of safety; but a more satisfactory reason is to be found in the greater extent and importance of the function which these organs in cattle have to discharge.

RED-WATER.

Although the destructive stimuli, which, under the form of unwholesome food, or diuretic medicine, are so often applied to the kidneys of the horse, are rarely used in the general management of cattle, or in the treatment of their diseases, these organs are, from the natural extent and importance of their function, much more liable to inflammation than the kidneys of the horse. The disease, termed *red-water* from the colour of the urine, is one of the most frequent and untractable maladies of cattle. It may be conveniently divided into *acute* and *chronic;* in fact, two diseases essentially different in their symptoms, demanding different treatment, and referrible to different organs, have been confounded under this name.

A cow, in somewhat too high condition, and in whom the prudent precautions of bleeding or physicking had been omitted, frequently, a week or two before the time of calving, suddenly exhibits symptoms of fever; she heaves at the flank; she ceases to ruminate, and evidently suffers much pain; her back is bowed; she is straining in order to evacuate her urine, and that is small in quantity, expelled with force, highly tinged with blood, and sometimes consisting of almost pure blood.*

At other times, a few days after calving, when she had not cleansed well, or was in too good condition, and had not had that dose of purgative medicine which should always follow parturition, she suddenly manifests the same symptoms of illness, speedily succeeded by a similar discharge of bloody urine.

The nature and cause of the disease are here evident enough. During the period of pregnancy there had been considerable determination of blood to the womb. A degree of susceptibility, a tendency to inflammatory action had been set up, and this had been increased as the period of parturition had approached, and was aggravated by the state and general fulness of blood to which she had incautiously been raised. The neighbouring organs necessarily participated in this, and the kidneys, to which so much blood is sent for the proper discharge of their function, either quickly shared in the inflammation of the womb, or first took on inflammation, and suffered most by means of it.

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*Mr. Storry, speaking of the force with which it is expelled, says, that he has sometimes found the neck of the bladder so contracted that he was compelled to use a catheter.

In other cases there is not this additional local determination: an over-driven bullock is seized with acute inflammation of the kidneys; another that has been shifted from poor to luxuriant pasture is soon observed to have red-water.* There are some seasons when it is in a manner epidemic, when a great proportion of the beasts in a certain district are attacked by it, and many of them die. Atmospheric influence has not been taken sufficiently into the account in the consideration of this and almost every other disease. It is seldom that one dairy is attacked by red-water without many or most of the neighbouring ones being annoyed by it, and especially if the soil and the productions of the soil are similar; and even cattle in the straw-yard have not then quite escaped. It is more prevalent in the spring and autumn than in the winter, and more in the winter than in the summer: it is particularly prevalent when, in either the spring or the fall of the year, warm days succeed to cold nights and a heavy dew. It is peculiar to certain pastures: the farmer scarcely dares to turn even the cattle of the country upon some of them; and a beast brought from a distant farm or market is sure to be attacked. It oftenest occurs in woody districts, and particularly in low marshy lands; but in them there are exceptions, which, in the present state of the botanical knowledge of the farmer and the veterinarian cannot be satisfactorily accounted for. A wall or a hedge may divide a perfectly safe pasture from another which gives the red-water to every beast that is turned upon it. One farmer scarcely knows what the disease is except by name, while on the grounds of his neighbour it destroys many a beast every year. The same pasture is safe at one time of the year and dangerous and destructive at another. The fields surrounded by copses may be stocked with impunity, or advantage, in summer or winter; but the farmer must beware of them when the buds are shooting or the leaves are falling.

The result of general experience is, that it has more to do with the nature of the food than with any other cause; and the production, or the unusual growth of the astringent and acrimonious plants may have considerable influence here. The different species of crowfoot, or ranunculus, and also the anemones, and particularly the white-wood (*anemone nemorosa*) and the yellow-wood (*anemone ranunculoides*) have been accused as the most frequent causes of this disease; but instinct will generally warn the animal to avoid sources of evil so palpable as these; and the malady may with more probability be traced to the quality of the general produce of the soil than to the prevalence of certain plants of known acrimonious or poisonous properties.

This noxious quality may be communicated by excess or deprivation of moisture. There is no farmer who is not aware of the injurious effect of the coarse rank herbage of low, and marshy, and woody countries, and he regards such districts as the chosen residence of red-water.

Mr. Ford, in a letter with which the author was favoured from him, says, that 'red-water was very prevalent in the neighbourhood of Etruria, in Staffordshire, about twenty years ago before the wet lands were drained. In a dairy of twenty or thirty cows, two-thirds of the number were afflicted with this disease annually, but since the draining not more than one or two annually have been attacked by it. The fair inference is, that swampy land is one cause of the disease, whether from the insalubrity of the atmosphere occasioned by the stagnant water, or from the coarse aquatic herbage with which such land abounds.' On the other hand, Mr. Harrison, of Lancaster, says,* that in 'the land situated east and south-east of that town, a lofty and wild region, and where, in hot and dry summers, water can rarely, if at all, be procured by the parched animals thereon, red-water rages like an epidemic, annually attacking all ages, and numbers falling victims to it, while in the surrounding valleys a case very rarely occurs.' He adds, 'I have known red-water make its appearance as an epidemic upon farms where it had hitherto remained unknown except by name, and which could be traced to no other apparent cause than an excess of draining, by which process the natural and artificial grasses had become altered in quality and quantity.'

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* A dairy in my neighbourhood was once removed from a farm on a flinty soil, to one on a strong clay, and every one of them, consisting of seventeen, were affected, Three of them died, *although they had been charmed.—Letter from Mr. Nobbs.*

The farmer must carefully observe the effect of the different parts of his farm in the production of this disease, and observation and thought may suggest to him that alteration of draining or manuring, or other management which may to a considerable degree remedy the evil.

Acute Red-water is ushered in by a discharge of bloody urine, and is *generally preceded by dysentery, suddenly changing to obstinate costiveness; and as soon as the costiveness is established the red-water appears.* There is laborious breathing, coldness of the extremities, ears and horns, heat of the mouth, tenderness of the loins, and every indication of fever: it often runs its course with fearful rapidity, and the animal is sometimes destroyed in a very few days.

When the carcass is examined there is generally found some inflammation of the kidney, enlargement of it, turgescence of its vessels, yet very rarely any considerable disorganization, and certainly not so much affection of it as would be expected; but in cows the uterus exhibits much greater inflammation; there is often ulceration, the formation of fœtid pus, and occasionally gangrene; there is also peritoneal inflammation, extensive, intense, with adhesions and effusions, while the lining membrane of the bowels rarely escapes inflammation and ulceration.

There can be little doubt about the treatment of such a disease. There has either been an undue quantity of blood determined to the kidneys with much local inflammation and before the pressure of which the vessels of that organ have given way, or so much blood has been always traversing the kidney, that there is a facility in setting up inflammation there. Bleeding will be the first step indicated. The first bleeding should be a copious one; but the repetition of it will depend upon circumstances. The hæmorrhage, or bleeding, is clearly *active*. It is produced by some irritation of the part: its colour shows that it proceeds from the minute arterial or capillary vessels. When bloody urine flows from the kidney, that organ is giving way under an increased discharge of its natural function, and that function is increased in order to compensate for the suspended one of another part, namely, the natural action of the bowels. Three objects will be accomplished by venesection: the first, a diminution of the general quantity of blood; the second—a consequence of the first—the removal of congestion in the part; and the third is the giving a different direction to the current of blood.

Purgatives should follow with a view more quickly and effectually to accomplish all these objects; and from the recollection of a circumstance most important to the practitioner, that red-water closely followed the establishment of constipation. A pound of Epsom salts should be immediately exhibited, and half-pound doses every eight hours afterwards, until the bowels are thoroughly acted upon.

There is too frequently great difficulty in purging cattle when labouring under red-water: dose after dose may be administered for three or four days, and yet the bowels will remain obstinately constipated. Either there is a strange indisposition in them to be acted upon, or, the rumen sympathising with the derangement of other organs, the muscular pillars of its roof yield to the weight of the fluid, whether hastily or cautiously administered, and the medicine enters that stomach, and is retained there until the beast is lost. The physic must be repeated again and again; it must gently trickle down the gullet, so that it shall fall on the roof of the paunch with as little force as possible; and, after the second day, in spite of the fever, unusual doses of aromatics must mingle with it, that the rumen, or the intestines, or both, may be stimulated to action. In the majority of cases, and especially before the strength of the animal becomes exhausted, *the commencement of purging will be the signal of recovery.*

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* Veterinarian, May, 1833, p. 244.

It, nevertheless, too often happens, that the constipated state of the bowels cannot be overcome, but the animal becomes rapidly weaker, while the blood assumes a darker, and sometimes a purple or even a black colour. The danger is now increased, and, probably, death is not far distant. In many cases, however, the beast not being too much exhausted, the dark and coffee-coloured urine is a favourable symptom, especially if it is discharged in evidently larger quantities, and not so frequently.

The appearance of the darker fluid, and even the continuance of the florid red urine, when the fever has subsided to a considerable degree, will indicate a different mode of treatment. The hæmorrhage will have become *passive.* The blood will flow because the vessels have lost their power of contracting on their contents. It has then been usual to give astringents; but this is dangerous practice, for the constipation, which is the worst symptom of the disease, and which immediately preceded the red-water, and was, probably, the exciting cause of it, may be confirmed or recalled. Stimulants, and those which act upon the kidney, will be most likely to have beneficial effect. The common turpentine, the balsam of copaiba, or even spirit of turpentine, especially if it is guarded by the addition of a few drachms of laudanum, may be given with advantage. The weakened vessels of the kidney may occasionally be roused to close on their contents, and the hæmorrhage may be arrested; but the author cannot agree with some of his correspondents, who say that it can easily be cured by almost any diuretic.*

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* A remedy of much repute in the neighbourhood of Chester, is a very simple and a very ridiculous one. A handful of salt and a handful of oatmeal are fried in a pan until black, and given in a quart of cold butter-milk, the beast being kept without food a little while before. 'This,' says the credulous, 'given once or twice will remove the complaint, *if not too long neglected.*' There is always some salvo of this kind attending the exhibition of these wonder-working medicines. A friend of the author's was standing by when Webb's infallible medicine for the cure of rabies was given to a dog. The animal died about the usual time, and the fellow was reproved on account of the inefficacy of his nostrum: 'Oh,' replied he, 'my medicine got all the madness out of him, you may depend upon it, but you did not support him, and of course he died.'

Captain J. Henderson, in his 'Survey of Caithness,' gravely tells his readers, that when the Highlanders find a beast troubled with red-water, they search either for a trout or a frog, and put it alive down the animal's throat; while others give warm milk as s specific. In Inverness cold water poured down the throat was formerly esteemed a sovereign remedy; or a decoction of nettles with a handful of salt.

In Dumbarton it is cured by water in which a portion of earth has been infused, with a few leaves of ash or alder.

In Roxburghshire a handful of salt was mixed with a pint of the beast's own blood as it came warm from the vein, and this was poured down his throat.

In some districts of Ireland a very successful preventive was used; the beast was daily drenched with water thickened with clay, until it became accustomed to the pasture.

Some of the farmers in Norfolk used to give a quart of churned milk, and a handful of salt. Others gave a quart of round coal reduced to powder, or a quart of coal ashes mingled with a quart of spring water, and this was deemed to be infallible.

Chronic red-water is more prevalent than that which is acute, and in its first stage, is far more a disease of the digestive organs, and especially of the liver, than of the kidney. The urine is observed to be of a *brown colour*, or *brown tinged with yellow*—the beast feeds nearly as well as before, but ruminates rather more lazily. In a few days a natural diarrhœa comes on, and the animal is well at once; or a purgative drink is administered, and a cure is presently effected. This occurs frequently in cows of weak constitution and in calves.

At other times there is manifest indisposition; the animal is dull, heavy, languid—the ears droop—the back is bowed—she separates from the herd—she refuses her food—she ceases to ruminate. Presently she gets better—she rejoins her companions; but this is only for a little while.* *The urine, which at first was brown, with a tinge of yellow, has now red mingling with the brown, or it is of the colour of porter.* It is increased in quantity—it is discharged sometimes with ease, at other times with considerable straining—in little jets, and with additional bowing of the back. The milk diminishes—it acquires a slight tinge of yellow or brown—the taste becomes unpleasant—it spoils all that it is mingled with. The pulse is accelerated—it reaches to 60 or 70. If blood is drawn, the serum which separates from it is brown. The skin is yellow—but of a darker yellow than in jaundice—it has a tinge of brown. The conjunctiva is also yellow, inclining to brown. The urine becomes of a darker hue—it is almost black. The animal usually shrinks when the loins are pressed upon; occasionally there is much tenderness, but oftener the beast scarcely shrinks more than he is accustomed to do when labouring under almost every disease. The belly is not so much tucked up as drawn together at the sides. There is considerable loss of condition—the legs and ears get cold—the animal is less inclined to move; there is evident and general debility. In every stage there is costiveness, and that exceedingly difficult to overcome; but, on close inquiry, it is ascertained that there was *diarrhœa at the beginning, and which was violent and fœtid, and which suddenly stopped.*

Mr. Dickens, of Kimbolton, says, that 'a few years back there was a gentleman living in Huntingdonshire who was very celebrated for the cure of red-water, and his son, a most respectable farmer, tells me the following was his never-failing recipe: Bal. armenian ℥ii. a handful of salt, and a strong decoction from the common nettle: of this he made a drink which he used to sell for 2*s.* 6*d.*'

Mr. T. Browne, of Hinckley, says, that red-water is not very common in his neighbourhood: and that he knows but of one farm that is subject to it: this farm lies in a low damp situation, and the farmer cures it by the administration of brandy.

Mr. Ford, speaking of the treatment of red-water in the neighbourhood of Etruria, says, that 'some use astringents, as rock alum, tincture of cantharides, and the juice of nettles; some give writing paper boiled to pieces in skimmed milk; while others give Epsom or Glauber salts, or common kitchen salt, in order to counteract the tendency to constipation, and leave the disease itself to the effort of nature, which usually stops the blood after a greater or less degree of exhaustion.'

In a book which is found on the shelves of many agriculturists, and a very useful one so far as the general treatment of cattle is concerned, the following remedy for red-water stands recorded: 'Take two or three handfuls of stinging nettles, and boil or stew them slowly in three quarts of water until reduced to one quart; when cool, give it to the beast. Then having ready a pint of common salt, put it into a quart bottle filled with chamber ley; shake it well until the salt be dissolved, and immediately give it to the beast. This remedy I believe to be infallible, and my success in this disorder has led me to many other discoveries. It is a doubt with me whether the nettles have any thing to do with the cure, as I have known this disease cured with buttermilk and pig's dung, and a frog with a large quantity of cold spring water; but I have known each of these remedies to fail; the former prescription never.'—*Parkinson's Treatise on Live Stock*, vol. i. p. 243. But enough of this absurdity!

* The author, however, has one case strong in his recollection, in which there was a respite of several months, and that repeated three times, but every cow in the dairy at length perished.

Examination after death shows the skin and the cellular membrane underneath to be of a dark yellow; the fat about the belly is of the same hue, or perhaps of a lighter tinge. The first and second stomachs are full: there is no fermentation and little gas, or sour smell. The manyplus is perfectly dry—baking could hardly add to the hardness—were it not for its weight it might be kicked about as a football. The leaves of the manyplus cling to the food contained between them: the papillæ leave their evident indentations on the hardened mass, and that mass cannot be detached without considerable portions of the cuticle clinging to it. The fourth stomach is empty, and the lining membrane covered with brown mucus, exhibiting patches of inflammation underneath. The intestines are rarely inflamed. There is no fluid in the belly, nor inflammation of its lining membrane. The kidney is of a yellow-brown colour, and sometimes a little enlarged, but *there is rarely inflammation or disease about it.* Drops of dark and brown-coloured urine may be pressed from it. The lungs display no mark of dangerous disease, but they too have a yellow hue. The fluid in the bag of the heart is yellow. The chyle, which is traversing the lacteal vessels, is yellow too, and there is the same discolouration of the fluids every where.

The liver is evidently of a darker colour; it is enlarged, generally inflamed, sometimes rotten, and filled with black blood. The gall-bladder is full, almost to distension. The bile is thick and black: it looks more like lamp-black mixed with oil, than like healthy bile.

All these appearances lead to the necessary conclusion that this is far more a disease of the digestive organs than of the kidney; in fact, that it is not primarily an affection of the kidney. It is disease of the liver, either consisting in inflammation of that organ, accompanied by increased secretion of bile, or a change in the quality of the bile. In consequence of this the whole circulatory fluid becomes tinged with the colour of the bile, and which is shown in the hue of the skin generally, and in the colour of the blood, and particularly in the change that takes place in that blood when drawn from the vein.

The fluid discharged from the kidneys participates in the general change; it becomes yellow—yellow-brown—brown. The change is most evident here, because so great a quantity of blood, in proportion to the size of the organ, circulates through the kidneys; and more particularly it is evident here, because it is the office or duty of the kidneys to separate from the blood, and to expel from the circulation, that which is foreign to the blood, or would be injurious to the animal.

The bile, however, possesses an acrid principle to a considerable degree. While it is an excrementitious substance that must be got rid of, it stimulates the intestinal canal as it passes along in order to be discharged; it particularly does so when it is secreted in undue quantities, or when its quality is altered. There is abundant proof of this in the bilious irritation and diarrhœa which cattle so frequently exhibit. The kidney, at length, is evidently irritated by the continued presence of this diseased fluid: it becomes inflamed, its minute vessels are ruptured, and a red hue begins to mingle with the brown. There is found discolouration and increased size of the kidney, and pain in the region of that organ; this, however, is rarely carried to any considerable extent, and the seat and principal ravages of disease are to be clearly traced to a different part, namely, the liver.

It is with peculiar pleasure that the author refers to the opinion of Mr. Harrison:* 'That chronic indigestion in cattle is a principle cause of most diseases to which they are incident, has long been observed by me. Hæmaturia, (red-water,) I am perfectly convinced, owes its origin to it, at least in the generality of cases; and I feel quite assured that the discolouration of urine is entirely referrible to that cause, and not to any nephritic affection, as is too generally, and oftentimes fatally supposed.'

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* Veterinarian, May, 1833, p. 244.

Mr. Friend is much of the same opinion. 'This disease appears to be one brought on also by indigestion. There are certain pastures which seem peculiarly to produce it, and certain seasons which seem equally to predispose towards it. Where the facts of the case can be got at, it is generally found that the mucous membrane of the intestines is first affected, producing diarrhœa; though this always extends as the disease proceeds to the peritoneal coat, and probably to the whole substance of the intestines, and the most obstinate costiveness is the result.'*

It is evident, then, that *acute* and *chronic* red-water, as the author of this treatise has termed them, (for he did not, in the present state of our knowledge of cattle medicine, dare to deviate too far from the usual arrangement and designation of disease,) are essentially different maladies: they belong to different organs—they are characterised by different symptoms—they require different treatment. The first is inflammation of the kidney; it is characterised by the evident pain and fever, and by the red and bloody urine which accompanies it in an early stage; it requires the most active treatment, and it speedily runs its course. The second is inflammation of, or altered secretion from, the liver; not often accompanied in its early stage by pain or fever; characterised by the dark brown colour of vitiated bile, and more slowly, but as fatally, undermining the strength of the constitution.

As to the first step in the treatment of chronic red-water, there is a difference of opinion among veterinary surgeons; many strongly recommend bleeding, and others as strenuously deprecate it. The truth is, that the propriety of bleeding depends on the condition of the beast, and the degree of fever. An animal in high or in fair condition can never be hurt by one bleeding; while, on the contrary, lurking, deceptive, fatal febrile action may be subdued. If there is the slightest degree of actual fever, nothing can excuse the neglect of bleeding. The quantity taken, or the repetition of the abstraction of blood, must be left to the judgment of the practitioner.

On the next step there is not a difference of opinion among well-informed men. The animal must be well purged if he is in a constipated state; or if there is already a discharge of glairy fæcal matter, the character of that must be changed by a purgative. There has been dispute, and more than there needed to be, as to the nature of the purgative. That is the best whose effects are most speedily and certainly produced, and there is no drug more to be depended upon in both these respects than the Epsom salts. It may be alternated with Glauber's salts, or common salt, or an aperient of a different character, sulphur, may be added to it. Much good effect is often produced by this mixture of aperients. Mr. Friend is a strenuous advocate of sulphur combined with Epsom salts; and, as there is either so much real costiveness—indisposition to be acted upon by purgative medicine—or so much relaxation of the floor of the œsophagean canal that the medicine falls into the rumen instead of going to its proper destination, and as the establishment of purgation seems to have so uniform and beneficial an effect in relieving the disease, the medicine that is adopted should be given in a full dose. It should consist of at least a pound of Epsom salts, and half a pound of sulphur, and this should be repeated in doses consisting of half the quantity of each, until the constipation is decidedly overcome.

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* Veterinarian, June, 1833, p. 299.

It is imperatively necessary that the practitioner should have made up his mind as to the real nature of the disease; for although he might, in inflammation of the kidney, fear to weaken by active purgation an animal that was likely to be speedily debilitated by excessive loss of blood, (yet that fear would generally be destitute of all reasonable foundation,) and would be tempted to try whether the hæmorrhage might not be arrested by astringents or stimulants, it would scarcely need a moment's reflection to convince him that he must check this excessive discharge of vitiated bile, or divert it from that organ which is chiefly suffering under its influence. Most of all he would be convinced, that he must restore the liver to a healthy discharge of its natural functions; and that he can best accomplish these purposes by freely opening the bowels, and in fact by no other means accomplish them. Stimulants would be dangerous, and astringent medicine would be actual poison in this disease.*

It will not be forgotten that the precautions already recommended should be carefully observed, in order to give the physic the best chance of passing into the bowels; that the patent pump should be in frequent requisition for the administration of clysters; and that when purging is once induced, a lax state of the bowels should be kept up by means of the frequent repetition of smaller doses of the medicine. The diet should consist principally of mashes, gruel, linseed tea, fresh cut young grass, young and fresh vetches, and a few carrots. The conclusion of the treatment will be best given in the language of Mr. Friend: 'I generally find it necessary to administer the Epsom salts in doses of four or six ounces, as an alterative, for a few days afterwards; to which, if there exist any debility, I add two drachms of the calumba powder, (gentian has better effect,) and one drachm of ginger.'†

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*Mr. Friend relates an anecdote that well illustrates this: 'Sir,' said a farmer once to him, (alluding to his having lost a beast with this disease,) 'the farrier cured the beast of his staling blood well enough, but somehow his drinks dried his body up, and killed him.'—*Veterinarian*, June, 1833, p. 299.

† Veterinarian, May, 1833, p. 245. The Highland Society of Scotland offered in 1830 a gold medal, or ten sovereigns, for the best essay on the causes, prevention, and cure of red-water. There were seven competitors, whose essays were published in the 'Quarterly Journal of Agriculture,' for May, 1831. The history of this prevalent and fatal disease cannot, perhaps, be better concluded than by a condensation of the substance of these papers. At that period they were the only publications of the slightest value on this important subject, and some of them reflect a high degree of credit on the authors.

One competitor was a farmer; and although there are very strange notions of this disease prevalent among agriculturists, yet the opinion of a sensible practical man is always valuable. Mr. W. A. Slaker, of Ardiffny, Aberdeenshire, states, that cows after calving, and calves after the milk is taken from them, are most liable to red-water; that it is most prevalent from the beginning of January to the end of April; that sudden transitions from heat to cold, and dry stimulating food, and *costiveness*, the natural consequence of the latter, or otherwise produced, are the chief *causes*. By way of *prevention*, he recommends that cows should be bled before calving, and that the bowels should be kept moderately open by occasional doses of common salt dissolved in water. As a *cure*, he gives twenty ounces of Epsom salts in warm water, and half an hour afterwards two quarts of gruel with half a pound of butter dissolved in it; half the quantity of the gruel and butter to be repeated every two hours; the physic to be repeated, if necessary, at the expiration of twenty-four hours; and, should the constipation be obstinate, clysters composed as follows should be frequently administered:—boil an ounce of aniseed in a quart of water, strain the clear liquor, and dissolve in it four ounces of butter, and a tablespoonful of salt. To calves he gives four ounces of Epsom salts, and half an ounce of nitre, with the same kind of gruel. He often finds the manyplus so dry that it might almost serve for fuel. He considers that more animals die of the fever by which the disease is accompanied than by the loss of blood, and thinks it of the utmost consequence

BLACK-WATER.

This is only another and the concluding stage of Red-water. When it follows the acute or inflammatory disease, it may be considered as a favourable symptom if the urine contains no purient matter, and has no

to keep the bowels open. Mr. Slaker writes like a sensible man, and would beat many a veterinary surgeon out of the field.

Mr. A. Henderson, land surveyor, Edinburgh, was bred a farmer, and had afterwards most extensive opportunities of observing this disease, and of which he appears to have diligently availed himself. He considers queys and cows most liable to red-water, which occasionally prevails at all times, but is most prevalent in cold spring, or long-continued dry summer weather. The *causes* are various: scarcity of water in summer—the drinking of bad or stagnant water—change of pasture, particularly from fine to coarse quality, yet often observed on a light soil, during a dry and hot season, and when cattle on a deeper soil would escape, and when on that soil, in a moist season, not one would be affected—change of atmospheric temperature—strains—bruises—or any thing that may excite inflammation in the kidneys or neighbouring parts. When cattle were journeying, he observed that twenty females were attacked for one male, and particularly such as had had calves—that at the commencement of the journey the disease was rarely very prevalent, provided there was a constant supply of water, and the weather proved steady—that want of water and sudden changes of weather soon produced it—that the tendency to it was increased by strains and bruises, and the cattle fretting, and riding upon each other, and by the unmerciful blows of the drivers, for those that fell behind, and were thus exposed to mal-treatment, were most frequently affected. It was his opinion, that it was more an accidental disease, and brought on by ill treatment, than a constitutional or epidemical one; yet some animals of the same breed and age were more subject to it than others, and those that once had the disease were more apt to be again affected by it.

Prevention.—A supply of pure water—the cattle not being put on change of pasture, and particularly of inferior quality, when hungry—not being put on rough, coarse pasture in summer, nor fed on heated hay in winter—not being put at once into a damp, cold pasture in the evening, after having been overheated during the day—and when the disease commences in a stock, a little blood being taken from all of them.

Cure.—Removal to some moderately, warm, dry, and sheltered place; bleeding; purging with common salt. In more advanced stages, and when the inflammation is subdued, two ounces of Castile soap, one ounce of bole armenian, half an ounce of dragon's blood, and one drachm of rock alum, in a quart of warm ale or beer. (?) In the still later stages the same drink, or occasionally a cordial one; clysters, and a stimulating embrocation to the loins.

Next stands Mr. A. Watt, druggist, Kintore. Every one who is really acquainted with the treatment of the diseases of cattle, views an essay on cattle medicine by a druggist south of the Tweed with a great deal of suspicion; and there seems to be cause for that suspicion further northward. It is strange that the Society should have admitted a paper recommending so many deadly poisons; and if a portion of it is here extracted, it is that the readers of the Farmer's Series may be warned against so murderous a practice: 'A liberal use of opium, with mercurials, alkalies, sulphuric acid, turpentine, ether, and nitre, is the best practice. I have found the annexed recipe to answer better than any yet tried, as out of 200 trials it only failed in four: take of tincture of opium half an ounce, sulphate of potash half an ounce, sulphuric acid sixty drops, spirit of hartshorn one ounce; mix, and give in a bottle of new milk: repeat every eight hours. If there should be costiveness, injections of butter, green oil, and warm water, should be employed. Loss of the hoofs and part of the tail may be prevented by rubbing the back and legs with salt brine twice a day for a week after the disorder has been subdued.'

The veterinary surgeon is always glad when the scientific practitioner of human medicine condescends to bestow some attention on the diseases of domestic animals. Dr. James Bayne, of Oatfield, Inverness, favoured the Society with a paper on red-water. If he is a little in error when he says that the disease is most severe and obstinate in males—that bulls are particularly liable to it—and that it generally makes its appearance during the summer months, and in the beginning of autumn, but *never* in winter and spring; yet his mode of cure is simple, scientific, and effectual. It forms a singular and pleasing contrast to that which was last mentioned. On the first appearance of the disease the animal is confined to the house or yard, and from half a pound to a pound and a half of Glauber salts administered; and if there is much appearance of fever, about a quart (qy. four or five quarts ?) of blood is taken from the neck; and if costiveness is present, frequent injections of warm water are administered. He has frequently injected a pailful at a time. During the continuance of the disease the animal should not be allowed to go out to pasture, but small quantities of cut grass should be given.

unpleasant smell. It shows that the blood is not discharged so rapidly and forcibly as it was; and that it hangs about the mouths of the vessels, or is contained in the cavity of the kidney, or in the bladder sufficiently

The three other competitors for the medal were veterinary surgeons.

Mr. B. W. Laing, of Banchory Ternan, Aberdeenshire, states, that in his district red-water occurs most frequently in autumn, winter, and the early part of spring; and is produced by want of exercise, want of access to earth, every cause of costiveness, the use of barley, and chaff, and the sudden setting in of frosty weather. As *preventives*, he recommends as much liberty as possible during the winter—bleeding and physicking two or three weeks before calving—thawing the turnips in frosty weather, and giving no boiled food or grain. As a *cure*, he has recourse to bleeding; he then gives, *in the form of balls*, twelve drachms of Barbadoes aloes, three of calomel, and an ounce of Castile soap; twelve hours after the administration of which he administers two ounces each of Epsom salts and common salt in cold water: after this, occasional doses of linseed oil are given until the physic operates. He then has recourse to the following drink, which is continued morning and evening until the water becomes clear: acetate of lead half a drachm, alum two drachms, and catechu two drachms, dissolved in boiling water, and given blood-warm. Immediately after this, two *gills* of vinegar, mixed with a bottle of cold water, are horned down. Surely, if the medicine is not deprived of much of its astringent power by the decomposition which must necessarily take place, this is almost as injudicious a practice as that of Mr. Watt, the druggist of Kintore.

Mr. Peter Smith, of Ardgethan, Aberdeenshire, stands next on the list. Although the reasoning on which it is founded may not be perfectly admissible, or, rather, it is too complicated to be easily understood or assented to, yet he adopts the very proper conclusion that red-water is not a local, but a constitutional disease. He would *prevent* it by administering aperient medicine during those states of the constitution, and under those circumstances, and at those periods of the year when an attack of the disease is most to be dreaded. As a *cure*, he places his chief dependence on purgation. He begins with a pound and a half of Epsom salts, and half a pint of castor oil, and this is soon accompanied by injections containing common salt and butter. The purgation is repeated every twelve hours, *until the urine becomes clearer*. When this has been accomplished he diminishes the dose, but he keeps the bowels under the influence of the medicine until the animal is quite recovered. Succulent vegetables are given at first, but after the bowels are well cleaned, and the urine becomes clearer, the cow may be allowed the moderate use of straw or hay. In bad cases, he inserts a blister in the dew-lap. When the animal is getting better, he gives half an ounce of each of carraway, aniseeds, and spirit of hartshorn.

Mr. Smith remarks, that in his neighbourhood red-water occurs during the summer months to cattle out of pasture; that animals reared in the district are rarely affected by it, but those from a district where the *darn* (the provincial name of this disease) does not occur, are almost sure to be seized with it; and that the inhabitants when purchasing cattle are careful to ascertain whether they are *darn-bred*, that is, whether they come from a district where darn prevails. The inhabitants attribute the disease to the wood anemone, (*anemone nemorosa*,) and give that plant the name of *darn-grass*, and which, they say, is a rare plant where darn does not occur, but is very common in the darn district. Mr. Smith's essay does him much credit.

The seventh competitor, and the most deserving, is *Mr. R. Thomson*, now of Beith. After a most accurate detail of symptoms, he states it to be his opinion, that it is the black, inspissated bile, which, taken up by the absorbents, and passed into the blood, colours all the secretions. He believes purgatives of any kind, given in large quantities of water, to be the best medicine that can be employed, and he prefers common salt. He continues his purgative, with plentiful dilution, until the bowels are well opened; and he afterwards keeps them in a lax state by administering linseed oil. Diuretics and astringents combined can be only of service when the bowels are open; and even then, the improper administration of them often causes inflammation of the bowels and kidneys. If the bowels are kept open by laxatives, the disease will generally disappear without their use.

Veterinary practitioners and agriculturists generally, are much indebted to the Highland Society of Scotland for the publication of these papers. However objectionable may be the treatment recommended in two of them, they all contain some useful hints, and that by Mr. Thomson comprises the substance of that treatment which is founded on principle, and will be attended by success where success can be obtained.

The following extract from a letter just received from Mr. Steel, V. S., of Biggar, N. B., is strongly confirmatory of the opinion the author has expressed of red-water, viz.: that it is far more a disease of the digestive than of the urinary system, and that the liver long to be changed from arterial to venous blood, and the practitioner will be encouraged to proceed in the course which he had adopted: but if purulent matter mingles with the black blood, it indicates the sad extent of the mischief that has been done. It is a proof of ulceration, if not of gangrene, and shows that a degree of disorganization has taken place which must speedily terminate in death.

If in chronic red-water, or that which depends on disease of the liver, the discharge becomes of a darker and still darker brown, until it has assumed an almost black character, it shows either that the system is loaded with a superabundance of this empoisoned secretion, and of which it cannot rid itself, or that the irritation caused by the continued presence of so acrimonious a fluid is producing inflammation, gangrene; and death in the vessels that are filled and oppressed by it. Mr. Thompson well describes this:—'In the last stage of the disease, when the urine assumes a darker brown or black colour, no remedy seems to have any efficacy; the animal is sunk beyond recovery, and he stretches himself out and dies as if perfectly exhausted.'*

INFLAMMATION OF THE KIDNEYS.

Cattle are occasionally subject to inflammation of the kidneys bearing considerable resemblance to acute red-water, but attended by more of the symptoms of pure inflammation of that organ in other animals. At first there are seldom any indications of disease beyond a straining effort in voiding the urine, and which is ejected forcibly and in small quantities, the loins being more than usually tender, and, perhaps, a little hot. In a day or two afterwards, however, the beast becomes dull, and careless about his food; the difficulty of staling increases; blood is perceived to mingle with the urine; the muzzle becomes dry; the horns and ears cold; the pulse frequent and hard, and the breathing quickened. Diarrhœa or dysentery is now observed; the evacuations are fœtid; they too are discharged with effort and in diminished quantities, and at length cease to appear.

The difficulty of passing the urine becomes rapidly greater; the beast strangely bows his back, and groans from intensity of pain; at length total suppression of urine ensues; cold sweats break out, principally about the back, sides, and shoulders, and the patient trembles all over; he moans continually, but the moaning gets lower and lower; he becomes paralyzed behind; the pulse can scarcely be felt; the animal falls; he is incapable of rising, and he dies in three or four days after the apparent commencement of the attack.

This is especially a disease of the spring time of the year. It is the consequence of over-nourishment: there is a predisposition to inflammation; and from some cause, more or less apparent, that inflammation is directed to the kidney. The treatment will comprise plentiful bleeding, active purging, the administration of emollient clysters, fomentation over the loins or the application of a mustard poultice to them, bran mashes, gruel, and a small quantity of green succulent food. There is a connexion between all these affections of the kidneys, and inflammation of the larger intestines lying in the neighbourhood of them; thence the previous dysentery, and the often obstinate constipation of red-water and pure inflammation of these organs; and thence the necessity of large and repeated

is the organ principally affected. He is describing a case of acute red-water. He says, —'The uterus had spots of inflammation, the gall-bladder was filled with a fluid resembling the urine which the cow was passing, the manyplus was rather hard and dry, and the kidneys had a relaxed bleached-like appearance. The blood, when it is drawn, very much resembles the urine; and there is sometimes no other difference, than that the blood coagulates, and the urine does not.'

[*] Quarterly Journal of Agriculture, May, 1831, p. 12.

doses of purgative medicine, but from which all stimulating ingredients should be excluded, and which would probably, in these cases, best consist of castor or linseed oil. The clysters also should be truly emollient, that while they assist in opening the bowels, they may act as soothing fomentations in the neighbourhood of the inflamed organ. Both the oil and the clysters should be continued until the inflammation has perfectly subsided. To the use of these the treatment should generally be confined—most certainly in no part of it should the slightest portion of diuretic medicine be administered.

THE KIDNEYS AND BLADDER.

The urine secreted, or separated by the kidney, having first accumulated in the cavity in the centre of that organ, is conveyed through a duct called *the ureter* to a more capacious reservoir, *the bladder*. The kidney of the ox is larger and better defended than that of the horse, on account of the increased importance of its function in an animal that is to furnish us with milk while living, and more solid food when dead. The ureters also are considerably larger; the internal membrane is stronger; the opening into the bladder is even nearer to the neck of that vessel than in the horse, and the ureters terminate much nearer to each other. Comparative anatomists also know that there are not any *renal capsules* in the ox. These are small, elongated, irregularly formed bodies, placed opposite to the kidneys, and between these organs and the spine. Their function is a subject still wrapped in utter obscurity.

The Bladder of the ox, larger, longer, and of a more oval form than that of the cow, is lodged between the rectum and the internal surface of the lower bones of the pelvis. It is supported by a transverse ligament, which ties it to the sides of the pelvis; while it is attached by cellular membrane to the rectum above and to the pelvis below. It is confined entirely to the cavity of the pelvis, for one of the compartments of the paunch affords an insuperable obstacle to its entering the proper cavity of the abdomen. When distended by urine, its increase of size is principally shown by its greater roundness, and not as in the horse, by its increased length and descent into the cavity of the belly. In examination and in operation for stone in the bladder this should not be lost sight of. It has three coats: the outer and peritoneal; the central or muscular, which is not so thick as in the horse, and consequently the force with which it contracts upon and expels the urine is not so great; and the inner coat, which is lined with numerous glands, that secrete a mucous fluid in order to defend the bladder from the acrimony of the urine.

The bladder terminates in a small neck, around which is a continuation of the common muscular coat, or, in the opinion of some, a distinct circular muscle, whose natural state is that of contraction; so that the passage remains closed, and the urine retained, until, the bladder being stretched to a certain extent, the fluid is expelled either by the will of the animal, or the involuntary contraction of the muscular coat. This muscle or this portion of the muscular coat, is considerably weaker in the ox than in the horse, for the intestines pressing upon the bladder are not so voluminous; and in the slow motion of the ox this vessel is not exposed to those concussions which it often experiences in the rapid progression of the horse, and in which the bladder has occasionally been ruptured. Advantage may be taken of this weakness of the sphincter muscle, for in retention of urine, or when, for the purpose of some operation, it may be expedient to empty the bladder, the slightest pressure upon it by the hand introduced into the rectum will readily effect it.

Having passed the sphincter muscle, the urine flows through the *urethra* and is evacuated. This canal is longer and smaller than it is in the horse; it also pursues a more tortuous path than that of the horse. The peculiar form and direction of some of the muscles of that region compel the penis to take a kind of double curve, not unlike an *S*, before it takes its ultimate straight course; and on these accounts the ox suffers oftener than the horse from the entanglement of calculi in the folds of the urethra.

The bladder of the cow is smaller and rounder than that of the ox. The rumen is as large as in the ox, and occupies the greater part of the abdomen; but additional room must be left for the impregnated uterus, and that is effected in some measure at the expense of the bladder; while also, to obviate the ill effects of occasional pressure in the distended state of the uterus, the sphincter muscle at the neck of the bladder of the cow is much larger and stronger than the same muscle in the ox.

The circumstances of disease to be considered with reference to the bladder are the foreign bodies, principally calculi, which it may contain; the inflammation resulting from that or from other causes; rupture, and inversion of it.

URINARY CALCULI.

Concretions are oftener found in the urinary passages of cattle than of the horse. Perhaps there is greater tendency to their formation in these animals. One cause of their retention may arise from the different form of the passages. The urethra has been described as smaller in cattle than in the horse, and therefore many calculi that would pass away with the urine in the one are retained in the bladder of the other, and thus become the nuclei of larger concretions, or the centre around which other matter collects, layer upon layer. It is probably on this account that calculi are found so much oftener in the ox than the cow; in the former the urethra is long and small, in the latter it is short and capacious.

The increased function discharged by the kidney in cattle may likewise account for the more frequent formation of calculi. When so much more blood passes through this organ in order that the useless or excrementitious parts of it may be expelled, the supposition is not unreasonable that a greater portion of the substances of which urinary calculi are composed will be found. The food of cattle may have much to do with it; and the greater proportion of earthy matter which they swallow, whether in the first rude cropping of the herbage, and the carelessness with which they often tear it up by the root, or the earth which they sometimes voluntarily take in order to prevent the development of acidity in the stomach, or to remove it.

The urinary calculi that have hitherto been examined have been found to be composed of nearly the same materials, and in proportions not often varying. They have chiefly yielded carbonate of lime, a small quantity of carbonate of magnesia, some traces of phosphate of lime, and a certain quantity of mucus, which has served as cement between the different layers that have accumlated around a central point. The form of the calculus has considerably differed. When there has been but one central nucleus, the form has been more or less circular; but in the majority of those which have fallen under the writer's observation, the stone has acquired magnitude by the union of various small distinct calculi. The form of the collected mass has consequently been exceedingly different in different specimens.

STONE IN THE KIDNEY.

One instance only of this has occurred in the author's practice, and he is not aware that any other is on record. It was supposed to be a case of acute red-water, or inflammation of the kidney, and was treated as such. The cow was bled and repeatedly physicked, but with variable and no satisfactory relief. Great pain was always expressed while the urine was voided; at other times there appeared to be colicy spasms; there was excessive tenderness on the loins, and some heat. The treatment continued five days; there was no amendment, and she began to lose flesh; but being yet in tolerably fair condition, she was destroyed.

There was considerable peritoneal inflammation, in which the intestinal convolutions in the neighbourhood of the right kidney were involved. It was evident, before the fatty capsule of the kidney was cut through, that the seat of disease lay in that organ. It was enlarged to nearly double its natural size, and was much inflamed. Its cavity was filled with a yellow muco-purulent fluid, in which were a great many calculi; some were scarcely larger than sand, but three were of the size of a kidney-bean. There was no inflammation of the ureter or the bladder, nor was any thing unusual found in them.

These calculi were irregularly formed—very light—porous—and of a yellow colour, deepening into brown. They were probably formed from the superabundance of that acid principle which is always found in the urine; and had a similar sandy substance, or small grains resembling coarse sand, been previously observed in the urine, it is possible that some good might have been done. The floor of the cow-house, and sometimes bare places in the field, will show where a considerable quantity of gritty matter has been discharged. This indicates a diseased state of the urine at the time, not perhaps sufficiently serious to interfere materially with the general health, but which may eventually lead to the formation of stone in the bladder or kidney, or to other serious maladies. The sandy matter is either white, approaching to grey or yellow; or it is brown, with varying shades of red or yellow.

Chemists have now satisfactorily ascertained the nature and causes of these discharges, and the means of remedying them. The light-coloured granules show deficiency, and the dark-coloured prove excess, of acid in the urine. In the one there is a deposit of earthy matter from deficiency of acid, and in the other there is a crystallization of the acid itself. In the one, cream of tartar, or dilute sulphuric acid might be administered with advantage; and in the other, earth, or a portion of chalk mixed with common loam, may be placed before the beast, or doses of carbonate of soda may be given. Danger is most to be apprehended from the white deposit, which is frequently the precursor or the accompaniment of gravel—a deposition in the bladder to which cattle are far more subject than farmers or agriculturists are usually aware.

STONE IN THE URETERS.

There can be no doubt that many calculi descend from the cavity or pelvis of the kidney through the ureters into the bladder; yet there is but one case of it on record. While the kidneys of cattle are considerably larger than those of the horse, the ureters are more than proportionably increased in bulk, and calculi of a moderate size readily pass through them.

The case is briefly and somewhat unsatisfactorily related by Hurtrel d'Arboval. He says* that Gattoin had sent to the Royal and Central Society of Agriculture a history of the sickness and the examination of a cow, in the left ureter of which many calculi were found, that had produced considerable dilatation of that canal, retention of urine above them, and all the symptoms that had preceded death. They were of a brilliant metallic bronze colour; they were polished, irregular and heavy. One of them was composed of several united together, and presented a very singular triangular form.

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* Dictionnarie de Méd. et Chirurg. Vét., CALCULI.

Chabert, according to Hurtrel d'Arboval, thinks that the presence of these calculi in the ureters might be detected by introducing the hand into the rectum. He does not seem to speak from experience; but he says, that in case of deficiency in the urinary discharge, accompanied by pain and fever, and tenderness on the loins, and especially by suppression of urine, he should endeavour to explore the ureters in this way. From the situation of the bladder in the pelvic cavity, this might be accomplished through the greater part of the course of the ureters. If calculi were detected in these passages, the practitioner should endeavour to force them on into the bladder, and, not being able to accomplish this, and knowing that the beast must otherwise die, he would perhaps have recourse to the dangerous operation recommended by Chabert—he would cut through the rectum and the ureter, and extract the stone.*

STONE IN THE BLADDER.

It is with the calculus that has descended into the bladder and there increased in size, or that was originally formed there, that the practitioner will have most to do either while it continues in the bladder, or in its after progress through the urethra.

The symptoms that would indicate stone in the bladder are somewhat obscure. There are many that prove plainly enough a state of suffering, and of general excitation or fever;—rumination ceases—the mouth is hot—the flanks heave—the animal is continually lying down and getting up again—it is looking mournfully towards its flank. Then comes a peculiar trembling of the hind limbs, and the frequent straining to void urine—a straining at some times quite ineffectual, at other times producing the discharge of a small quantity, and that occasionally mingled with blood. These symptoms will direct the attention of the practitioner to the urinary organs. In order to ascertain the nature of the complaint, he will introduce his hand into the rectum. The bladder will easily be detected. It will probably be distended by urine: he will gently press upon it, and the contained fluid will be expelled, and if there is a calculus in the bladder it will be readily felt. He must not, however; be alarmed if this pressure should at first produce violent pain resembling colic—he must desist for a few minutes, and try again. A sound could not be used for the purpose of detecting the calculus, nor even the flexible catheter that is of such admirable use for the horse.

There are two courses to be pursued in such a case—either to slaughter the animal immediately, if it should be in tolerable condition, or to remove the stone by the usual operation of lithotomy. All attempts to dissolve the calculus by the use of muriatic or any other acid will be as fruitless as they have proved to be in the human being; and the length and small calibre of the urethra, as well as its double curve, prevent the possibility of having recourse to the safe and effectual operation of breaking down the stone within the bladder.

The beast being cast, and properly confined, the operator will recollect a very material difference in the construction of these parts in the horse and the ox. In the horse, he would be able to pass a stilett up the urethra as far as its curve into the pelvis, and to make his first and chief incision at once; but in the ox, on account of the length of the penis, or for other reasons, two muscles descend from the anus, and pursue their course until they arrive at about the middle of the penis, a little in front of the scrotum; there they attach themselves to the penis, and draw it up, and force it to bend or curve upon itself; and it takes, as has already been stated, the form of an inverted *S*. No stilett can be forced through such a double curvature. The operator must either cut down on the urethra, without any stilett within to guide him, at the point where again, below the anus, it curves round the pelvic bones in order to enter the pelvic cavity, and which, if he is a tolerable anatomist, and proceeds with some caution, he may readily accomplish; or he must get rid of the first curve, and that may be effected without much difficulty. The hair must be cut off immediately in front of the scrotum; a longitudinal incision must then be made, six inches in length, through the sheath, upon the penis, and in the direction in which it lies. The penis being exposed, it is seized and drawn forward in its sheath; the muscles relax, the penis is readily brought into a straight direction, and held so for a sufficient time to admit the introduction of a stilett, which should either be composed of whalebone, and very flexible, or it should be made of iron, and jointed, resembling that used for the stone operation on the horse by Mr. Taylor, of Nottingham.* The more flexible the catheter is, the more readily it will accommodate itself to the tendency of the muscles to restore the inverted *S* curve, and the more readily likewise may it be bent round the bony arch beyond, and so diminish the length of the incision which must afterwards be made between the anus and the scrotum.

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* Dict. de Méd. et Chirurg. Vét., Calculi.

The sound being passed through the curvature thus temporarily removed, and its point felt below the anus, the operator must cut into the urethra at that part. Into this opening he must introduce another rod, straight and grooved, and pass it on into the bladder; and then, by means of a probe-pointed bistoury running in this groove, the incision must be carried on to the side of the anus, and through a portion of the neck of the bladder corresponding with the supposed size of the calculus. The operator must then pass his right hand into the rectum, and the two first fingers of the left hand into the bladder, and with the right hand guide the calculus between the fingers of the left hand, by which, or by means of a pair of forceps pushed into the wound, it should be seized and extracted.

It is not always that there will be much bleeding, or that it will be necessary to take up any of the vessels, or even to pass any sutures through the edges of the wound, unless the incision has been more than usually large. The urine will for a few days be principally passed through the wound, but a portion of it will soon begin to find its way through the urethra, and that quantity will daily increase, and, in quite as short a time as can be expected, the wound will be perfectly healed.

STONE IN THE URETHRA.

On account of the length, and narrowness, and curvature of the urethra in the ox, obstruction of that passage by a calculus is a circumstance of too frequent occurrence. The symptom which would lead to a suspicion of this would be, in addition to the evidence of considerable pain, and general irritation, a complete, or almost complete, suppression of urine. The practitioner should examine the urethra through the whole of its course anterior to the inverted *S* curve; the calculus will then be felt, or probably the protuberance caused by its presence will be immediately seen. The duty of the surgeon is now, in most cases easily and quickly performed. An *oblique* incision must be made upon the calculus, sufficiently long to enable it to be taken out. By means of the *oblique* incision, the calculus and the urethra are less likely to roll under the knife, and the wound will more readily heal. One or two sutures should be passed through the edges of the wound, which will speedily adhere. The operation is simple, but the danger of neglect is great; and many a beast has been lost by the bladder being distended, and continuing so until violent inflammation of its mucous coat has taken place, or it has been ruptured.

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* Veterinarian, April, 1834, p. 201.

Should not the calculus be in this anterior portion of the urethra, that between the scrotum and the anus should be carefully examined; and if it is not found there, it is imprisoned somewhere in the inverted *S* curve. An incision must then be made anteriorly to the scrotum, in the manner already described; the penis drawn out; the curve for a while obliterated; the situation of the obstruction discovered; the urethra laid open at that point; and the calculus extracted.

M. Peyron relates a singular case of calculus in the urethra. He was sent for in great haste to an ox that was evidently in great pain. The animal was continually getting up and lying down, and straining to void his urine, but only a few drops appeared. On looking attentively at the course of the urethra, while a tapping motion was made on the upper part of it, the fluctuation of some fluid could be perceived. From this, M. Peyron concluded that the passage through the urethra was obstructed. He cut into the canal at the place where it proceeded from the ischium, and the urine immediately gushed out. He did not push the operation further, persuaded that after he had been so fortunate as to extract the calculus, *another would soon descend from the bladder and form a fresh obstruction.* The beast was kept during a month, and then sold advantageously, having fully retained its condition, but the urine had continued to flow from the wound during the whole time.* The reasoning of M. Peyron would not have satisfied most practitioners, but they would have endeavoured to ascertain the precise situation of the calculus, and extracted it, undeterred by the fear of that which might never have happened: the case, however, shows that no material mischief will be done, even if the wound should not readily heal.†

Some veterinarians have remarked, that oxen are most subject to the formation of these calculi during the autumn and winter; and that, as the spring advances, the new grass produces a more abundant secretion of urine, and thus relaxes the urinary organs, and enables the calculi more easily to pass; while the fresh herbage gives an alkaline and soapy character to the urine, which causes some of the recently formed calculi to be dissolved in the bladder.

RUPTURE OF THE BLADDER.

This is the necessary consequence of over-distension of a vessel the coats of which are naturally weak; or it may be produced by a careless or brutal mode of casting the animal. It would not require any great shock in order to rupture the bladder, after suppression of urine had existed several days, and the coats of the bladder had begun to be weakened by inflammation.

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* Journal Pratique, 1827, p. 333.

† An interesting account of the operation of lithotomy on the horse will be found in Perceval's Lectures, vol. iii. p. 45; another by Mr. Sewell, Assistant Professor at the Royal Veterinary College, in the "Veterinarian" for May, 1829, p. 172; and a third, and the most detailed and satisfactory, by Mr. Taylor of Nottingham, in the "Veterinarian," for April, 1834, p. 201. The operation of DILATATION, which Mr. Perceval ("Lectures," vol. iii. p. 47,) describes as singularly applicable in veterinary practice, not only in the female but in the male subject, could not possibly succeed in the ox.

M. Peyron examined a beast that had laboured under suppression of urine eight days: he was slaughtered, and the bladder was found to be ruptured. No mention is made of any effect produced by the urine in the abdominal cavity, either as exciting peritoneal inflammation or discolouring the flesh; it is, therefore, probable that the rupture had taken place a little while only before death, and perhaps in the act of falling. In another case, the perfect depression of the animal, the feeble and slow pulse, and the staggering walk, coupled with a long suppression of urine, excited a suspicion that rupture of the bladder had already taken place; and on examination after death, the whole of the abdominal cavity was so discoloured by the urine that the meat could not be used.

The circumstances which would most unerringly indicate a rupture of the bladder would be the impossibility of detecting that vessel in the pelvic cavity when the hand was introduced into the rectum; or, after the bladder had been felt, round and hard almost as a foot-ball, and the animal had been expressing in every possible way the torture he endured, a perfect calm all at once succeeding. This would probably be hailed by the inexperienced practitioner as a symptom of recovery, but the skilful one would regard it as the forerunner of death. If a day or two had passed since the rupture of the bladder, the experienced eye would detect it by a certain engorgement of the limbs, and particularly of the hind limbs; and there would often be an evident urinous smell about the animal even before it was dead. In such case, the bladder is commonly found in a state of gangrene; the intestines are highly inflamed, and the whole of the meat is discoloured and nauseous. It is, therefore, of consequence to ascertain the state of these parts during the life of the animal, either that an operation may be attempted, or that the farmer may sell him, while there is any thing about him that is saleable beside his skin. In fine, when it is recollected that the existence of these calculi betrays a constitutional tendency to their formation, and that the removal of one may at no great length of time be followed by the appearance of another; when, from the length and narrowness, and, more especially, from the singular curvature of the urethra in the ox, it is in a manner impossible for calculi half so large to pass as those that easily traverse this canal in the horse; and that the walls of the bladder in the ox are so weak compared with those of the horse, it will become a matter for consideration, whether the beast, in good saleable condition, should not be destroyed as soon as this obstruction is clearly ascertained: and, most certainly, the animal that has been successfully operated upon for suppression of urine, and that is not then fit for the market, should be fattened, and got rid of as quickly as possible.

The cow is in a manner exempt from these sad accidents, because the calculi readily find their way through her short, and capacious, and straight urethra.

INVERSION OF THE BLADDER.

This has occasionally taken place in the violent throws of parturition. The efforts of the practitioner must then be confined to the preservation of the calf, for the bladder can never be returned to its natural situation: and although the mother might possibly survive the removal of this vessel, yet as the urine must continue to be secreted, and to be got rid of, and, trickling down her legs, would produce constant soreness and ulceration, she would ever be a nuisance to herself, and a disgusting object to those who had the care of her.

The following case, which happened to a skilful practitioner, may perhaps be a warning to others: A cow had been three days in the act of calving, and little advance had been made. She was lying on her right side exhausted, but occasionally lowing mournfully, and making violent efforts to expel the fœtus. A round, fibrous, white tumour presented itself—it was evidently distended by some fluid, for the fluctuation was detected at the slightest touch. Not dreaming that it could be any thing beside the membranous bag which contained the natural uterine fluid, he punctured it, and he was astonished when that which ran out had the colour and smell of urine. It was the bladder which had protruded through a rent in the vagina, and which he might have recognised by its smaller bulk, its firmer texture, and by the ease with which the neck would have been discovered after a very slight examination. The calf was saved—the mother might, probably, have been saved too—the internal laceration might have been healed, and the practitioner would have escaped the consciousness of having made a somewhat disgraceful blunder.

CHAPTER XVI.

BREEDING.—PARTURITION.

The characteristics of the different breeds of British cattle, the peculiar excellences and the peculiar defects of each, and their comparative value, as adapted to different climates and soil and pasture, have been already considered: a few remarks on *the principles* of breeding were reserved for this chapter.

That which lies at the foundation of the improvement of every stock, or the successful management of it, is the fact—the common, but too much neglected axiom, that '*like produces like.*' This is the governing law in every portion of animated nature. There is not a deviation from it in the vegetable world, and the exceptions are few and far between among the lower classes of animals. When in the higher species the principle may not seem at all times to hold good, it is because another power, the intellectual—the imaginative—somewhat controls the mere organic one; or, in a great many instances, the organic principle is still in full activity, for the lost resemblance to generations gone by is pleasingly and strongly revived. The principle that 'like produces like,'* was that which gave birth to the valuable, but too short-lived, new Leicester breed; it was the principle to which England is indebted for the short-horns, that are now establishing their superiority in every district of the kingdom. Every cow and heifer of the SHAKSPEARE blood could be recognized at first sight as having descended from Mr. Fowler's stock; and the admirer of the short-horns can trace in the best cattle of the present day the undoubted lineaments of FAVOURITE.

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* 'The simple observation, that domestic animals possess a tendency to produce animals of a quality similar to their own, was the ground-work of all Bakewell's proceedings. It was equally obvious to others as to him, but by him first applied to the useful purpose to which it has since been rendered subservient. Having made this observation, he inferred that by bringing together males and females possessing the same valuable properties, he should insure their presence in their offspring, probably in an increased degree. they being inherited from both parents; and he concluded, that by persisting in breeding from animals the produce of such selections, always keeping in sight the properties that constituted their value, he should at length establish a breed of cattle of which those properties would form the distinguishing and necessary characteristic. By this process it was that in his time, with respect to his long-horns, and subsequently with regard to other breeds of cattle, the term *blood* came to be distinctively applied. When reference could be made to a number of ancestors of distinguished excellence, the term *blood* was admitted.' The Rev. H. Berry's admirably Prize Essay on Breeding.

This principle extends to form, constitution, qualities, predisposition to, and exemption from disease, and to every thing that can render an animal valuable or worthless. It equally applies to the dam and to the sire. It is the foundation of scientific and successful breeding.*

Let it be supposed, that the cattle of a certain farmer have some excellent qualities about them; but there is a defect which considerably deteriorates from their value, and which he is anxious to remove. He remembers that 'like produces like,' and he looks about for a bull that possesses the excellence which he wishes to engraft on his own breed. He tries the experiment, and, to his astonishment, it is a perfect failure. His stock, so far from improving, have deteriorated.

The cause of this every-day occurrence was, that he did not fairly estimate the extent of the principle from which he expected so much. This new bull had the good point that was wanting in his old stock; but he too was deficient somewhere else, and, therefore, although his cattle had in some degree improved by him in one way, that was more than counterbalanced by the inheritance of his defects. Here is the secret of every failure—the grand principle of breeding. The new-comer, while he possesses that which was a desideratum in the old stock, should likewise possess every good quality that they had previously exhibited—then, and then alone, will there be improvement without alloy. What can a farmer expect if he sends a worthless cow to the best-bred bull—or, on the other hand, if his cows, although they may have many good qualities, are served by a bull that perhaps he has scarcely seen, or whose points he has not studied, and whose only recommendations are, that he is close at hand and may be had for little money?

The question as to the comparative influence of the sire and the dam is a difficult one to decide. That farmer will not err, who applies the grand principle of breeding equally to both of them. In the present system of breeding, most importance, and that very justly, is attributed to the male. He is the more valuable animal, and principally more valuable on account of the more numerous progeny that is to proceed from him, and thus his greater general influence; and therefore superior care is bestowed on the first selection of him for rearing. The farmer studies the bull-calf closely, and assures himself that he possesses, in a more than usual degree, the characteristic excellences of the breed. When this care as to the possession of such combination of good points has extended from the sire to the son through several successive generations, it may be readily supposed that he will possess them in a higher degree than the female can. They will be made, as it were, a part and portion of his constitution, and he will acquire the power of more certainly, and to a greater extent, communicating them to his offspring.

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* There are a few strange exceptions to this, showing the power of imagination even over so dull a beast as the cow. Her progeny is often much affected by circumstances that happen during the time of conception, or rather during the period she is in season. Mr. Boswell says. 'One of the most intelligent breeders I ever met with in Scotland, Mr. Mustard, of Angus, told me a singular fact with regard to what I have now stated. One of his cows chanced to come in season, while pasturing on a field, which was bounded by that of one of his neighbours, out of which an ox jumped, and went with the cow, until she was brought home to the bull. The ox was white, with black spots, and horned. Mr. Mustard had not a horned beast in his possession, nor one with any white on it. Nevertheless, the produce of the following spring was a black and white calf with horns.'—Quarterly Journal of Agriculture, vol. i. Essays, p. 28.

In this way the influence of the sire may, in well-bred animals, be considered as superior to that of the female; but hers is always great, and must not be forgotten. In Arabia, where the mare is the object of chief attention, and her good qualities are carefully studied and systematically bred in her, the influence of the female decidedly preponderates; and, on the same principle, that of the highly bred cow will preponderate over that of the half-bred bull. Her excellences are an hereditary and essential part of her, and more likely to be communicated to her offspring than those which have been only lately and accidentally acquired by the bull with no pedigree, or with many a blot in it. Custom and convenience, however, induce the generality of breeds to look most to the male.*

At the outset of his career, the farmer should have a clear and determined conception of the object that he wishes to accomplish. He should consider the nature of his farm; its abundance or deficiency of pasturage; the character of the soil; the seasons of the year when he will have plenty or deficiency of food, the locality of his farm; the market to which he has access, and the produce which will there be disposed of with greatest profit, and these things will at once point to him the kind of beast which he should be solicitous to obtain. The man of wealth and patriotism may have more extensive views, and nobly look to the general improvement of British cattle; but the farmer, with his limited means, and with the claims that press upon him, regards his cattle as a valuable portion of his own little property, and on which every thing should appear to be in natural keeping, and be turned to the best advantage.

The best beast for him is that which suits his farm the best; and, with a view to this, he studies, or ought to study, the points and qualities of his own cattle, and those of his neighbours. The dairy-man will regard the quantity of milk—the quality—the time that the cow continues in milk—its value for the production of butter or cheese—the character of the breed for quietness—or as being good nurses—the predisposition to red-water, garget, or dropping after calving—the natural tendency to turn every thing to nutriment—the easiness with which she is fattened, when given up as a milker, and the proportion of food requisite to keep her in full milk, or to fatten her when dry. The grazier will consider the kind of beast which his land will bear—the kind of meat most in demand in his neighbourhood—the early maturity—the quickness of fattening at any age—the quality of the meat—the parts on which the flesh and fat are principally laid—and, more than all, the hardihood and the adaptation of constitution to the climate and soil.

In order to obtain these valuable properties, the farmer will make himself perfectly master of the character and qualities of his own stock. He will trace the connexion of certain good qualities and certain bad ones, with an almost invariable peculiarity of shape and structure; and at length he will arrive at a clear conception, not so much of beauty of form (although that is a pleasing object to contemplate) as of that outline and proportion of parts with which *utility* is oftenest combined. Then carefully viewing his stock, he will consider where they approach to, and how far they wander from, this utility of form; and he will be anxious to preserve or to increase the one, and to supply the deficiency of the other.* He will endeavour to select from his own stock those animals that excel in the most valuable points, and particularly those which possess the greatest number of these points; and he will unhesitatingly condemn every beast that betrays manifest deficiency in any one important point. He will not, however, too long confine himself to his own stock, unless it is a very numerous one. The breeding from close affinities--the breeding *in and in* —has many advantages to a certain extent. It may be pursued until the excellent form and quality of the breed is developed and established. It was the source whence sprung the cattle and the sheep of Bakewell, and the superior cattle of Colling; and to it must also be traced the speedy degeneracy—the absolute disappearance of the new Leicester cattle, and, in the hands of many an agriculturist, the impairment of constitution and decreased value of the new Leicester sheep and the short-horned beasts. It has, therefore, become a kind of principle with the agriculturist to effect some change in his stock every second or third year, and that change is most conveniently effected by introducing a new bull. This bull should be, as nearly as possible, of the same sort; coming from a similar pasturage and climate; but possessing no relationship—or, at most, a very distant one—to the stock to which he is introduced. He should bring with him every good point which the breeder has laboured hard to produce in his stock, and, if possible, some improvement, and especially where the old stock may have been somewhat deficient; and most certainly he should have no manifest defect of form; and that most essential of all qualifications, a hardy constitution, should not be wanting.

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* Mr. Adam Ferguson, of Woodhill, to whom the Highland Society of Scotland, and the Scottish agriculturists generally, are so much indebted, has an amusing anecdote on this point. 'I recollect, several years ago, at a distinguished breeder's in Northumberland, meeting with a shrewd Scottish borderer, (indeed, if report be true, the original and identical Dinmont,) who, after admiring with a considerable spice of national pique, a very short-horned bull, demanded anxiously to see the dam. The cow being accordingly produced, and, having undergone a regular survey, Dandy vociferated, with characteristic *pith*, "I think naething of your bull now, wi' sic a caumb."' Quarterly Journal of Agriculture, vol. i. p. 34.

There is one circumstance, however, which the breeder occasionally forgets, but which is of as much importance to the permanent value of his stock as any careful selection of animals can be—and that is, good keep. It was judiciously remarked by the author of the 'Agricultural Report of Staffordshire,' that 'all good stock must be both bred with attention and well fed. It is necessary that these two essentials in this species of improvement should always accompany each other; for without good resources of keeping, it would be vain to attempt supporting a capital stock.' This is true with regard to the original stock; it is yet more evident when animals are absurdly brought from a better to a poorer soil. The original stock will deteriorate if neglected and half-starved, and the improved breed will lose ground even more rapidly, and to a far greater extent.

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* 'Upon the principle that "like produces like," he (Bakewell) started, and the advantages which crowned his exertions may be thus stated: an increased perfection of general symmetry, by which is to be understood not only a form attractive to the eye of taste, but one in which the judgment acknowledged a considerable preponderance of the valuable parts of the carcass over those of less value; an increased tendency to lay on flesh of a superior quality under all circumstances of feeding, and, of course, a superior article for the use of the consumer, produced by a decreased consumption of vegetable or other food.

'A person would often be puzzled: he would find different individuals possessing different perfections in different degrees—one, good flesh, and a tendency to fatten, with a bad form—another, with fine form, but bad flesh, and little disposition to acquire fat:—what rule should he lay down, by the observance of which good might be generally produced, and as little evil as possible effected?—UTILITY. The truly good form is that which secures constitution, health, and vigour—a disposition to lay on flesh, and with the greatest possible reduction of offal. Having obtained this, other things are of minor, although perhaps of considerable, importance.'—The Rev. H. Berry's Prize Essay.

The full consideration, however, of the subject of breeding belongs to the work on 'British Husbandry,' and there full justice will be done to it; but the few hints that have here been dropped with reference to the fundamental principles on which the improvement of cattle must be founded will not, perhaps, be deemed irrelevant.*

THE PROPER AGE FOR BREEDING.

The proper age at which the process of breeding may be commenced will depend on various circumstances. Even with the early maturity of the short horns, if the heifers could be suffered to run until they were two and a half, or three years old, they would become larger, finer, and more valuable; and their progeny would be larger and stronger: but the expense of the keep for so long a time is a question that must be taken into serious consideration. The custom which at one period was beginning to be so prevalent in the breeding districts, of putting the heifer to the male at one year old, or even at an earlier period, cannot be too much reprobated. At the time when they are most rapidly growing themselves, a sufficient quantity of nutriment cannot be devoted to the full development of the fœtus, and both the mother and the calf must inevitably suffer.

From two, to two and a half years old, according to the quality of the pasture, will be the most advantageous time for putting the heifer to the bull. In fair pasture, the heifer will probably have attained sufficient growth at two years. If the period is prolonged after three years, and especially with good keep, the animal will often be in too high condition, and there will be much uncertainty as to her becoming pregnant.† At an

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* The following extract from 'the Rev. H. Berry's Prize Essay' contains the sum and substance of the principles of breeding:—

'A person selecting a stock from which to breed, notwithstanding he has set up for himself a standard of perfection, will obtain them with qualifications of different descriptions, and in different degrees. In breeding from such he will exercise his judgment, and decide what are indispensable or desirable qualities, and will cross with animals with a view to establish them. His proceeding will be of the "give and take" kind. He will submit to the introduction of a trifling defect, in order that he may profit by a great excellence; and between excellences, perhaps somewhat incompatible, he will decide on which is the greatest, and give it the preference.

'To a person commencing improvement, the best advice is to get as good a *bull* as he can; and if he be a good one of his kind, to use him indiscriminately with all his cows; and when by this proceeding, which ought to be persisted in, his stock has, with an occasional change of bull, become sufficiently stamped with desirable excellences, his selection of males should then be made, to eradicate defects which he thinks it desirable to get rid of.

'He will not fail to keep in view the necessity of *good blood* in the bulls resorted to, for that will give the only *assurance* that they will transmit their own valuable properties to their offspring; but he must not depend on this alone, or he will soon run the risk of degeneracy.

'In animals evincing an extraordinary degree of perfection, and where the constitution is decidedly good, and there is no prominent defect, a little close breeding may be allowed—as the son with the mother, to whom he is only half blood—or the brother with the sister. But this must not be injudiciously adopted or carried too far, for although it may increase and confirm valuable properties, it will also increase and confirm defects; and no breeder need be long in discovering that in an improved state animals have a greater tendency to defect than to perfection. Close breeding, from affinities, impairs the constitution, and affects the procreative powers, and therefore a strong cross is occasionally necessary.

† When heifers of this age will not stand their bulling, a couple doses of physic, or the turning on shorter pasture until they next come into season, will set all right.

Mr. Parkinson's opinion, although somewhat different in one point from that we have stated, deserves consideration:—'I had three heifers, when I lived at Slane, early age there will often be danger in calving from the heifer not having attained her proper size; and another, that has her first calf too late, will be in danger from fever.

It will be evident from this that the bull should not be suffered to run with the young stock; and although it is said that cows are quieter, and thrive better, and are more readily and surely impregnated as they come in season when they have the bull with them in the pasture, yet it is becoming more the practice, and often very advantageously so, to separate him from them altogether. By watching the cows as they come into season, and keeping them back when the time of parturition would be inconvenient, the farmer will be enabled to get them to calve at the periods that best suit his pasture or his arrangements. The calves may be dropped at the beginning of the year, when veal and butter will yield the greatest profit; or later in the season, when the spring grass is preparing to come in, and when the young animal will thrive better, and a greater secretion of milk, and the habit of yielding it at every subsequent calving, will be established in the mother.*

That which has been said of the best age for beginning to breed in the cow will equally apply to the bull. It is absurd and dangerous to begin to use him as some have done when a yearling. He will come into season at two years old—he will be better at three; and although the farmer may not deem it prudent to keep him more than two or three years, he may then be sold advantageously, in his full prime, to another breeder.

ABORTION, OR SLINKING.

The usual period of pregnancy in a cow is nine calendar months, or 270 days; but there is often considerable variation in the time of what seems to be a natural delivery, and when the calf is likely to live.†

The cow, however, is more than any other animal subject to abortion. This takes place at different periods of pregnancy, from half of the usual time to the seventh, or almost the eighth month. The symptoms of the approach of abortion, except the breeder is very much among his stock, are not often perceived; or if perceived, they are concealed by the cowherd, lest he should be accused of neglect or improper treatment.

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took the bull at one year old, I believe, in consequence of their being reared in the open air at the haystacks, which caused them to be forwarder. I had not the least idea of this happening, or I should have prevented it, as I think it very injudicious. It is the opinion of some persons, that by suffering heifers to be three or four years old they make fine cattle, but I never found any material difference; while there is a loss of one year, besides the danger of not standing the bulling; and it adds very much to the profit of the heifer if she be given to the bull at two or two-and-a-half years old, for the time she is in calf, added to that of the calf sucking and the time she will be fattening bring her to four or four years and a half when she is slaughtered. A heifer that has had a calf will fatten quicker and tallow better than one of the same age that has not, while a calf is gained, worth, if of a good breed, eight or ten pounds as a store beast.' —*Treatise on Live Stock*, vol. i. p. 99.

* Most of the various recipes to bring a cow into season are absurd and dangerous. One given by Mr. Parkinson is the simplest, the most harmless, and the most successful too:—'Give a quart or more of milk, immediately drawn from a cow that is in season, before the bull has been admitted to her, and in three or four days it will have the desired effect.'—*Treatise on Live Stock*, vol. i. p. 101.

The repeated return of the period of heat during the spring and summer months will, if the farmer keeps his bull apart from the cows, enable him to arrange the periods of parturition almost at his pleasure.

† M. Tessier, in a Memoir read to the Royal Academy of Sciences at Paris, says, that in 1131 cows, which he had the opportunity of observing, the shortest period of gestation was 240 days, and the longest 321—difference 81 days; and counting from nine months, 51 days over, and 30 days under.

The cow is somewhat off her feed—rumination ceases—she is listless and dull—the milk diminishes or dries up—the motions of the fœtus become more feeble, and at length cease altogether—there is a slight degree of enlargement of the belly—there is a little staggering in her walk—when she is down she lies longer than usual, and when she gets up she stands for a longer time motionless. As the abortion approaches, a yellow or red glairy fluid runs from the vagina) this is a symptom which rarely or never deceives)—her breathing becomes laborious and slightly convulsive. The belly has for several days lost its natural rotundity, and has been evidently falling—she begins to moan—the pulse becomes small, wiry, and intermittent. At length labour comes on, and is often attended with much difficulty and danger.

If the abortion has been caused by blows or violence, whether arising from the brutality of the cowherd, or the animal being teased by other cows in season, or by unskilfully castrated oxen, the symptoms are more intense. The animal suddenly ceases to eat and to ruminate—she is uneasy, paws the ground, rests her head on the manger while she is standing, and on her flank when she is lying down—hemorrhage frequently comes on from the uterus, or when this is not the case, the mouth of the uterus is spasmodically contracted. The throes come on, they are distressingly violent, and they continue until the womb is ruptured. Should not all these circumstances be observed, yet the labour is protracted and dangerous.

Abortion is sometimes singularly frequent in particular districts, or on particular farms. It seems to assume an epizootic or epidemic form. This has been accounted for in various ways. Some have imagined it to be contagious. It is destructively propagated among the cows, but this is probably to be explained on a different principle than that of contagion. It has been stated that the cow is an animal considerably imaginative, and highly irritable during the period of pregnancy. In abortion the fœtus is often putrid before it is discharged; and the placenta, or afterbirth, rarely or never immediately follows it, but becomes decomposed, and, as it drops away in fragments, emits a peculiar and most noisome smell. This smell seems to be singularly annoying to the other cows—they sniff at it, and then run bellowing about. Some sympathetic influence is produced on their uterine organs, and in a few days a greater or less number of those that had pastured together likewise abort. Hence arises the rapidity with which the fœtus is usually taken away and buried deeply, and far from the cows; and hence the more effectual preventive of smearing the parts of the cow with tar or stinking oils, in order to conceal or subdue the smell; and hence, too, the ineffectual preventing of removing her to a far distant pasture.

Chabert, in his ‘Veterinary Instructions,’ relates a singular case of this—a kind of pest or plague in the dairy of a farmer at Toury. For thirty years his cows had been subject to abortion. His cowhouse was large and airy; his cows were apparently in good health; they were fed like others in the village; they drank from the same pond; there was nothing different in the pasture; his servants were not accustomed to ill-use the cattle, and he had changed these servants many times in the thirty years. He had changed his bull many a time—he had pulled down his cowhouse, and he had built another in a different situation, with a different aspect, and on a different plan; he had even (agreeably to the superstition of the neighbourhood) taken away the aborted calf through the window, that the curse of future abortion might not be entailed on the cow that passed over the same threshold; nay, to make all sure, he had broken through the wall at the end of the cowhouse, and opened a new door, in order that there might not be the possibility that an elf-struck fœtus had previously gone that way; but still a greater or less number of his cows every year slunk their calves.

Thirty years before he had bought a cow at a fair, and she had warped, and others had speedily followed her example; and the cow that had once slunk her calf was liable to do the same in the following year, and so the destructive habit had been perpetuated among his beasts.

Several of the cows have died in the act of abortion, and he had replaced them by others; more of those that had aborted once or twice, or oftener, had been sold, and the vacancies filled up. M. Chabert advised him to make a thorough change. This had never occurred to the farmer, but he at once saw the propriety of the counsel. He sold every beast, and the plague was stayed.* This sympathetic influence is one main cause of the slinking of the calves. There is no contagion, but the result is as fatal as the direst contagion could have made it.

Another cause of abortion is the extravagantly high condition in which cows are sometimes kept. They are in a continual state of excitement; and from the slightest cause inflammation is set up in the uterus, rendered more susceptible by the state of pregnancy, and abortion is the frequent consequence of that inflammation.

M. Cruzel has given an instructive account of abortion thus produced. He was consulted by a farmer who had ten breeding cows, that occasionally worked at the plough; as is often the case in France. During the first year three of them aborted. They recovered, and were soon again in calf. Two of them slunk their calves a second time, between the fifth and sixth month of pregnancy; the third went her full time and produced a weakly calf that died on the second day. In the following year a fourth aborted, and M. Cruzel was sent for. He was immediately struck with the unnecessary high condition in which all the cows and their calves were: he carefully inquired, but could discover no other probable cause for these repeated accidents, and he at once attributed them to the state of plethora in which the beasts were kept. He ordered their quantity of food to be materially reduced—he bled every one of them—the farmer took care that nutriment should not afterwards be so dangerously wasted upon them, and abortion ceased to appear on the farm.†

Mr. Wedge, in his 'Survey of Cheshire,' confirms this. He says that "slinking happens generally in wet seasons, or *when the cattle are in very high condition*, and generally continues for two or three years together. In several parts of North Wales, where the cattle through necessity are kept in lower condition, instances of the kind very rarely happen.'

The pastures on which the blood or inflammatory fever is most prevalent are those on which the cows oftenest slink their calves. Whatever can become a source of general excitation and fever is likely, during pregnancy, to produce inflammation of the womb: or whatever would, under other circumstances, excite inflammation of almost any organ, has at that time its injurious effect determined to this particular one.

There are some curious illustrations of this. It is well known that cattle of all kinds are sometimes seriously injured by feeding in the autumn on grass thickly covered with hoar-frost. Inflammation of the bowels of a dangerous character, and sometimes palsy of the rumen, have been thus produced. In Switzerland, the commencement of the hoar-frost is the signal for the appearance of abortion. It is occasionally seen at other times in all the cantons, but now its victims are multiplied tenfold. M. Barruel, V. S.

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* Instructions Vétérinaires, tom. vi. p. 117.

† Journ. Théor et Prat., 1832, p. 157.

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of Chartres, speaks of sixteen cows that aborted at different periods of pregnancy from this cause, and most of which died.*

It has been stated (page 505) that acrid plants are often prejudicial to cattle. 'There is no farmer who is not aware of the injurious effect of the coarse, rank herbage of low, marshy, and woody countries, and he regards these districts as the chosen residence of red-water;' it may be added, that these districts are also the chosen residence of abortion.

Hard and mineral waters are justly considered as laying the foundation for many diseases in cattle, and for this among the rest. A writer in a German Periodical gives the following account:—'In 1822 twelve of his in-calf heifers cast their calves, and in the following year the like accident happened to twelve others, the whole of which used to drink from ponds the water of which was strongly impregnated with iron. In 1824 ten cows that were watered at other places all calved safely, while a single cow that was allowed to drink of the ferruginous water cast her calf. The same occured in two following years.'†

Some careful observers have occasionally attributed abortion to the disproportion in size between the male and female. Farmers used to be too fond of looking out for a great overgrown bull for their dairy or breeding cows, and many a heifer or little cow was seriously injured: she either cast her calf or was lost in parturition. This error has been long exploded among the breeders of sheep; and breeders of cattle are beginning to act more wisely.‡

Cows that have been long afflicted with hoose, and that degenerating into consumption, are exceedingly subject to abortion. They are continually at heat—they rarely become pregnant, or if they do, a great proportion of them cast their calves. When consumption is established, and the cow is much wasted away, she will rarely retain her calf during the natural period of pregnancy.

An in-calf beast will scarcely have hoove to any considerable extent without afterwards aborting. The pressure of the distended rumen seems to injure or destroy the fœtus. Even where the distension of the stomach does not wear a serious character, abortion often follows the sudden change from poor to luxuriant food. Cows that have been out and half-starved in the winter, and incautiously turned on rich pasture in the spring, are too apt to cast their calves from the undue general or local excitation that is set up; and, as has been already remarked, a sudden change from rich pasture to a state of comparative starvation will produce the same effect, but from an opposite cause. Hence it is that when this disposition to abort first appears in a dairy, it is usually in a cow that has been lately purchased. Fright, from whatever cause, may produce abortion. There are singular cases on record of whole herds of cows slinking their calves after being terrified by an unusually violent thunder-storm.§ Commerce with the bull soon after conception is a frequent cause of abortion. The casting of the calf has already been attributed to the sympathetic influence of the effluvia from the decomposing placenta: there are plenty of instances in which other putrid smells have produced the same effect, and therefore the inmates of crowded cowhouses are not unfrequently subject to this mishap.

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* Journ. Théor. et Prat., 1832, p. 154.

† Landund Hauswirth, March, 1827, p. 132.

‡ Mr. Wedge, in his 'Survey of Cheshire,' says that a whole dairy of nearly twenty cows cast their calves in one year. The farmer sold the bull he had used to a neighbour, and the whole number of cows to which he was put cast their calves also. The original owner took back the bull, and three of his cows were again put to him, and they also cast their calves. In this instance there was clearly some defect in the male.

§ Instructions Vétérinaires, vol. vi. p. 154. Dr. Rudge, in his 'Survey of Gloucestershire,' says, that there was an enclosure near Arlingham, close to which was a dog-kennel. Eight heifers and cows out of twenty warped, in consequence, as it was supposed by the farmer, of the frequent exposure of flesh, and the skinning of dead horses before them. The remainder were removed to a distant pasture and did well.

Besides these tangible causes of abortion, there is the mysterious agency of the atmosphere. There are certain seasons when abortion is strangely frequent and fatal; while at other times it in a manner disappears for several successive years. In the 'Leipsic Agricultural Gazette,' March 22, 1777, it is stated, that, 'by an unheard-of fatality, the abortion of cows in that district was almost general, and that after the most anxious research, no assignable cause for it could be discovered, nor would any medicine or medical treatment arrest the plague.'

In 1789, all the cows in Beaulieu aborted. This, however, was traced to the long continuance of wet weather.*

In 1782 the cows near Granvilliers slinked their young, and this was attributed to the excessive heat of the preceding summer. In 1784 almost all the cows and mares at Châlons aborted, and the cause was unknown.† In 1787 all the cows at Bournonville cast their calves. They had not been out of the cowhouse during the whole of the winter, and had been well taken care of.‡ There is no doubt that this must be added to the number of epidemic diseases.

The consequences of premature calving are frequently of a very serious nature. It has been stated that there is often considerable spasmodic closure of the mouth of the uterus, and that the calf is produced with much difficulty and pain, and especially if a few days have elapsed after the death of the young one. When this is the case the mother frequently dies, or her recovery is much slower than after natural parturition. The coat continues rough and staring for a long time—the skin clings to the ribs—the appetite does not return, and the milk is dried up. Some internal chronic complaint now takes its rise, and the foundation is laid for consumption and death.

When the case is more favourable, the results are, nevertheless, often annoying. The cow very soon goes again to heat, but in a great many cases she fails to become pregnant; she almost certainly does so if she is put to the bull during the first heat after abortion. The heat again and again returns, but she does not stand to the bulling; and so the season is wasted, while she becomes a perfect nuisance by continually worrying the other cattle.§

If she should come in calf again during that season, it is very probable that about the same period of utero-gestation, or a little later, she will again abort; or that when she becomes in calf in the following year, the same fatality will attend her. Some say that this disposition to cast her young one gradually ceases; that if she does miscarry, it is at a later and still later period of pregnancy; and that, in about three or four years, she may be depended upon as a tolerably safe breeder: he, however, would be exceedingly inattentive to his interest who kept a profitless beast so long.

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* Instructions Vétérinaires, tom. vi. p. 137. † Ibid. pp. 130, 131.

‡ Somewhat analogous is an account given by White, in his most interesting and instructive work, the 'Natural History of Selborne.' Dr. Johnson says, that in 1771, the season was so severe in the Isle of Skye, that it is remembered by the name of the *black spring*. The snow, which seldom lies at all, covered the ground for eight weeks; many cattle died, and those that survived were so emaciated that they did not require the male at the usual season. The case was just the same with us here in the South. Never were so many barren cows known as in the spring following that dreadful period: whole dairies missed being in calf together.—P. 396.

§ The French have a very expressive name for these cows: they call them *taureillères*. A kind of nymphomania is produced, under the influence of which the cow frequently wastes away and becomes a perfect skeleton.

The calf very rarely lives, and in the majority of cases it is born dead or putrid. If there should appear to be any chance of saving it, it should be washed with warm water, carefully dried, and fed frequently with small quantities of new milk, mixed, according to the apparent weakness of the animal, either with raw eggs or good gruel; while the bowels should, if occasion requires, be opened by means of small doses of castor oil. If any considerable period has to elapse before the natural term of pregnancy would have expired, it will usually be necessary to bring up the little animal entirely by the hand.

The treatment of abortion will differ little from that of parturition, presently to be described. If the farmer has once been tormented by this pest in his dairy, he should carefully watch the approaching symptoms of casting the calf, and as soon as he perceives them, should remove the cow from the pasture to a comfortable cowhouse or shed. If the discharge is glairy, but not offensive, he may hope that the calf is not dead: he will be assured of this by the motion of the fœtus, and then it is possible that the abortion may yet be avoided. He should hasten to bleed her, and that copiously, in proportion to her age, size, condition, and the state of excitation in which he may find her; and he should give a dose of physic immediately after the bleeding. The physic beginning to operate, he should administer half a drachm of opium and half an ounce of sweet spirit of nitre. Unless she is in a state of great debility, he should avoid above all things the *comfortable drink*, which some persons so strangely recommend; and which the cowleech will be almost sure to administer. He should allow nothing but gruel, and he should keep his patient as quiet as he can. By these means he may occasionally allay the general or local irritation that precedes or causes the abortion, and the cow may yet go to her full time.

Should, however, the discharge be fœtid, the natural conclusion will be that the fœtus is dead, and must be got rid of, and that as speedily as possible. Bleeding may even then be requisite, if much fever exists; or, perchance, the aforesaid comfortable drink may not be out of place. In other respects, the animal must be treated as if her usual time of pregnancy had been accomplished.

Much may be done in the way of *preventing* the formation of this habit of abortion among the cows. *The fœtus must be got rid of immediately.* It should be buried deep, and far from the cow-pasture. Proper means should be taken to hasten the expulsion of the placenta. A dose of physic should be given; the ergot of rye, as hereafter to be described, should be administered; the hand should be introduced, and an effort made, cautiously and gently, to detach the placenta: all violence, however, should be carefully avoided, for considerable and fatal hemorrhage may be speedily produced. The parts of the cow should be well washed with a solution of the chloride of lime, and this should be injected up the vagina, and also given internally. In the mean time, and especially after the expulsion of the placenta, the cowhouse should be well washed with the same solution, in the manner that was recommended when the treatment of the malignant epidemic was under consideration.

The cow, when beginning to recover, should be fattened and sold. This is the first and the grand step towards the prevention of abortion, and he is unwise who does not immediately adopt it. All other means are comparatively inefficient and worthless. It was the charm by means of which Chabert arrested the plague which for thirty successive years had devastated the farm at Toury. Should the owner be reluctant to part with her, two months at least should pass before she is permitted to return to her companions. Prudence would probably dictate that she should never return to them; but be kept, if possible, on some distant part of the farm.

Abortion having once occurred on the farm, the breeding cows should be carefully watched. Although well fed, they should not be suffered to get into too high condition. Unless they are decidedly poor and weak, they should be bled between the third and fourth months of pregnancy, and a mild dose of physic should be administered to each. If the pest continues to reappear, the owner should most carefully examine how far any of the causes of abortion that have been detected may exist on his farm, and exert himself in carefully removing them.

SYMPTOMS OF PREGNANCY.

The symptoms of pregnancy in its early stage used to be thought exceedingly unsatisfactory. The period of being in season (which generally lasts three or four days, and then ceases for a while, and returns in about three weeks or a month) might entirely pass over; and although it was then probable that conception had taken place, yet in a great many instances the hopes of the breeder were disappointed. It was not until between the third and fourth month, when the belly began to enlarge, or in many cases considerably later, and when the motions of the fœtus might be seen, or at all events felt by pressing on the right flank, that the farmer could be assured that his cow was in calf. That greatest of improvements in veterinary practice, the application of the ear to the chest and belly of various animals (in order to detect, by the different sounds—which, after a short time, will be easily recognised—the state of the circulation through most of the internal organs, and consequently the precise seat and degree of inflammation and danger), has now enabled the breeder to ascertain the existence of pregnancy at as early a stage of it as six or eight weeks. The beating of the heart of the calf will be distinctly heard, twice, or more than twice as frequent as that of the mother; and each pulsation will betray the singular double beating of the fœtal heart. This will also be accompanied by the audible rushing of the blood through the vessels of the placenta. The ear should be applied to the right flank, beginning on the superior part of it, and gradually shifted downwards and backwards. These sounds will soon be heard, and cannot be mistaken.*

TREATMENT BEFORE CALVING.

Little alteration needs to be made in the management of the cow for the first seven months of pregnancy; except that, as she has not only to yield milk for the profit of the farmer but to nourish the fœtus which is growing in her womb, she should be well, yet not too luxuriantly fed. The half-starved cow will not adequately discharge this double duty, nor provide sufficient nutriment for the calf when it has dropped; while the cow in high condition will be dangerously disposed to inflammation and fever, when, at the time of parturition, she is otherwise so susceptible of the power of every stimulus. If the season and the convenience of the farmer will admit of it, she will be better at pasture, at least for some hours in the day, than altogether confined in the cowhouse.

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* The following is an extract from an 'Essay on Auscultation, as the only unequivocal Evidence of Pregnancy,' by Dr. J. C. Ferguson, Professor of Midwifery at King's College, London. The whole of the Essay is important even to the veterinary practitioner, and reflects the highest credit on the power of philosophical investigation and the truly philanthrophic spirit of the wrirer:—'A goat had been procured for a very different purpose by Drs. Hunt, Corrigan, and myself, and bound on its back on the operating table. I casually applied the stethoscope to its abdomen, without the slightest previous knowledge of its pregnancy, and was surpised to detect almost immediately the distinct double pulsations of a fœtal heart. My two friends, to whose accuracy of observation I have often been indebted, satisfied themselves perfectly of the fact; and on examining the uterus about an hour afterwards, we extracted a fœtus, the heart of which did not exceed the size of a hazel nut. On inquiring of the person who sold us the goat, and on whose accuracy we could depend, we learnt that it was exactly seven weeks from copulation.'—Dublin Medical Transactions, vol. i. part 1; New Series.

At a somewhat uncertain period before she calves, there will be a new secretion of milk for the expected little one; and under the notion of somewhat recruiting her strength, in order better to enable her to discharge her new duty, but more from the uniform testimony of experience that there is danger of local inflammation and of general fever—garget in the udder, and puerperal fever, if the new milk descends while the old milk continues to flow, it has been usual to let the cow *go dry* for some period before parturition. Farmers and breeders have been strangely divided as to the length of this period. It must be decided by circumstances. A cow in good condition may be milked much longer than a poor one. Her abundance of food renders a period of respite almost unnecessary; and all that needs to be taken care of is that the old milk should be fairly gone before the new milk *springs*. In such a cow, while there is danger of inflammation from the sudden rush of the new milk into a bag already occupied, there is also considerable danger of indurations and tumours in the teats from the habit of secretion being too long suspended. The emaciated and overmilked beast, however, must rest a while before she can again advantageously discharge the duties of a mother.

Were the period of pregnancy of equal length at all times and in all cows, the one that has been well fed might be milked until within a fortnight or three weeks of parturition; while a holiday of two months should be granted to the poorer beast; but as there is much irregularity about this, it may be prudent to take a month or five weeks as the average period.

The process of parturition is one that is necessarily accompanied by a great deal of febrile excitement; and therefore, when it nearly approaches, not only should a little care be taken to lessen the quantity of food, and to remove that which is of a stimulating nature, but a mild dose of physic, and a bleeding regulated by the condition of the animal, will be very proper precautionary measures.

A moderately open state of the bowels is more necessary at the period of parturition in the cow than in the mare. During the whole time of pregnancy her enormous stomachs sufficiently press upon and confine the womb; and that pressure may be productive of injurious or fatal consequences, if at this period the rumen is suffered to be distended by unnutritious food, or the manyplus takes on that hardened state to which it is occasionally subject. Breeders have been sadly negligent here.

NATURAL LABOUR.

The springing of the udder, or the rapid enlargement of it from the renewed secretion of milk—the enlargement of the external parts of the bearing (the former, as it has been said by some, in old cows, and the latter in young ones)—the appearance of a glaring discharge from the bearing—the evident dropping of the belly, with the appearance of leanness and narrowness between the shape and the udder—a degree of uneasiness and fidgetiness—moaning occasionally—accelerated respiration—all these symptoms will announce that the time of calving is not far off. The cow should be brought near home, and put in some quiet, sheltered place.

In cold or stormy weather she should be housed. Her uneasiness will rapidly increase—she will be continually getting up and lying down—her tail will begin to be elevated, and the commencement of the labour-pains will soon be evident.

The natural progress of parturition should not be unnecessarily interfered with. The cow should be frequently looked at, but not disturbed. Although her pains may not be so strong as could be wished, she should not be too closely approached or examined until the water-bladder or bag containing the fluid in which the calf has hitherto floated has protruded and is broken. Soon afterwards it may be proper to ascertain whether the calf is '*coming the right way.*' In the natural presentation of the fœtus, the calf may be considered as couching or lying on its belly; its fore-legs protruding into the passage, its head lying upon them, or being a little between them, and reaching down about as far as the knees, and the back of the calf corresponding with or opposed to the back of the mother.

While the throes continue tolerably strong, the farmer or practitioner should have patience, although the progress of the labour may be tediously slow. Nature will at length safely accomplish her object. But if the pains are evidently diminishing, and hour after hour has passed and the calf protrudes little or not at all more than it did, assistance should be rendered. A pint of sound ale, warmed, should be given in an equal quantity of gruel; warm gruel should be frequently administered, or at least put within the animal's reach; and access to cold water should be carefully prevented.

To the first pint of ale should be added a quarter of an ounce of the ergot of rye (spurred rye,) finely powdered; and the same quantity of the ergot, with half a pint of ale, should be repeated every hour until the pains are reproduced in their former and natural strength, or the labour is terminated.*

MECHANICAL ASSISTANCE.

The power of medicine failing, recourse should be had to mechanical assistance. Twelve hours or more having elapsed from the commencement of the labour, this should be done, even although the calf may continue to be alive; and it should not be deferred one moment after it is ascertained that the fœtus is dead. Even now, however, the cow should not be disturbed more than is absolutely necessary; and it cannot be too deeply impressed on the mind of the farmer, that the frequent habit of rousing the poor animal, and driving her about, while she is in the act of calving, or even before the labour begins, is an unnatural, brutal, and dangerous one.

Mr. Skellett, in his work on 'the Parturition of the Cow,' (a truly valuable one as it regards the point now under consideration, the mechanical assistance that can be rendered in difficult and protracted labour,) observes, ‘ As the business proceeds, and the pains increase in strength and rapidity, she confines herself to a lying posture, and in this posture she is delivered of the calf. When we reflect on this conduct of the animal, left to herself, we cannot too much reprobate the advice of those who recommend the driving her in the act of calving, or immediately before it takes place. The author has known a great many instances where it has proved the death of the cow, by producing inflammation and all its bad consequences. Every rational man will agree that the above practice is both cruel and inconsistent; for the animal herself, as soon as the hours of calving come on, immediately leaves the rest of the flock, and retires to some corner of the field, or under a hedge, in order to prevent the other cows or any thing else coming near that may disturb her in bringing forward her young.’—P. 113.

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* There is some difference of opinion among practitioners as to the power of the spurred rye. Mr. Allinson, of Idle, says ('Veterinarian,' Feb. 1834, p. 73) 'The ergot of rye has never yet failed in my practice to stimulate the uterus of cattle, whether the muscular power of that organ was exhausted by previous efforts, or torpid from peculiar temperament.' On the other hand, Mr. Harrison, of Lancaster, ('Veterinarian,' July, 1834, p. 360,) relates a case in which he gave it to the extent of more than a quarter of a pound without its producing the slightest effect.

The experience of the author of this work is undoubtedly in favour of the ergot. On the morning in which he writes this note, he witnessed its power in exciting the womb of a deer to a very powerful action; but he must acknowledge that he has more than once, like Mr. Harrison, been disappointed in his expectations from it, which he is inclined to attribute to the peculiar formation of the stomachs of cattle which so often suspends the action of the most powerful purgative. He likewise adds his testimony to that of Mr. Harrison, that although it may not produce the desired stimulating effect on the uterus, there is no danger to be apprehended from its use in moderate quantities. He would therefore advise every practitioner and every farmer to have it at hand.

Some interesting accounts of its power of exciting uterine action in other animals are contained in the numbers of the 'Veterinarian' for September and October, 1833.

If the head is sufficiently advanced to be grasped by the hands, or for a hand to be introduced by the side of it so as to urge it forward, an assistant at the same time laying hold of the fore-legs, and pulling with moderate force at each of the throes of the mother, the little animal may often be brought forward without endangering its life. If, however, it is firmly impacted in the passage, a cord with a slip knot should be fastened round each leg immediately above the fetlock, and a third cord around the lower jaw. Greater power may then be applied, the persons holding the cords pulling in concert, accommodating themselves to the natural pains of the mother, and exerting their strength, although somewhat forcibly, yet quietly and gradually. Here again the brutal violence resorted to by some persons is much to be reprobated; it inevitably destroys the calf, and endangers the life of the mother. If the fœtus cannot be extracted by moderate force, one of the shoulders should be *slipped* (taken off,) which may easily be effected by means of a small knife curved like those used for pruning, so as to be easily introduced into the passage in the hollow of the hand, and there used without danger of wounding the cow. An incision should be made in the fore-arm of the fœtus, and the skin elevated and turned back by means either of the knife or the fingers. The shoulder may then be easily detached from the body and drawn out; and the bulk of the calf being thus materially lessened, the remainder of it will be readily extracted.

UNNATURAL PRESENTATION.

It will soon be evident whether the calf is in the right position. The appearance of the feet and the situation of the head will be satisfactory on this point: but from fright, or violence, or some unknown cause, the position of the fœtus is sometimes strangely altered, so as to render its extraction difficult or impossible. Mr. Skellett has given a very useful account of these unnatural or false presentations and to which the reader is referred; a slight sketch only of the most frequent of them being here introduced.

In some cases, although the throes rapidly succeed each other and are not deficient in power, nothing, or perhaps only the mere hoofs, protrude from the vagina. This must not be suffered long to continue, for if it does, the strength of the cow will be rapidly wasted. The hand and arm, having been well oiled, must be introduced into the passage in order to ascertain the position of the fœtus. The whole of the passage being probably well occupied by the head or fore-limbs, and the uterus and the vagina powerfully contracting, the arm of the operator will receive very considerable and benumbing pressure; and sometimes to such an extent that the perfect feeling of the limb will not be restored until some hours have passed. This must not be regarded, but the surgeon must steadily, yet not violently, push the arm forward, taking care that he does not wound the cow with his nails.

If he finds the fore-feet far up the passage, and the head between them, but sunk down below the bones of the pelvis, he will immediately perceive that the extraction of the calf is impossible while it remains in this position. He will therefore pass a cord with a slip-knot round each of the feet, and push them back into the womb. Next, with the slip-knot of a third cord in his hand, he will push back the whole of the fœtus gradually, but firmly, until he is able to get his hand under the head and elevate it and pass the noose round the lower jaw: then grasping the upper jaw and endeavouring thus to raise the muzzle above the rim of the pelvis, his assistants will draw the three cords and easily bring the head and the feet into the passage in the natural position.

If the head is not depressed between the feet, but bent down on one side below the passage, cords must be put round the fore-feet, and they are to be returned as in the other case. The head is to be sought out, and a noose passed round the jaw, and then the operaror putting his hand against the chest of the fœtus and pushing it back, his assistants are to gently draw the three cords, until the head and the feet are properly placed. Great care should, however. be taken that, in drawing out the fore-feet, the womb is not injured by the hoofs; they should generally be brought forward separately and guarded by the hand of the operator within the womb. If there should be insuperable difficulty in raising and bringing the head round, and the calf is dead, the skin must be turned back from one of the legs, beginning at the fore-arm and reaching the shoulder, as already described, and the shoulder detached, which, considering the weakness of the muscles and ligaments at that age, will be readily effected. The assistant then pulling steadily at the legs, and the surgeon forcing the chest back into the belly, the extraction of the fœtus will rarely be difficult.

It may happen that after many throes no portion of the fœtus appears, but the calf is found turned in the womb, with his back resting on the belly of the mother, the feet against the spine, the head depressed below the bones of the pelvis, and the poll pressing against these bones. To turn the calf in this position will be difficult, and often impossible; but, cords having been fastened, as before, to the feet and the lower jaw, the hand should be introduced under the head, so as to raise it in some measure, and enable the assistants, by means of the cords, to bring it and the feet into the passage. If the fœtus should be dead, or the life of the mother appears to be in danger, it will be very easy, while in this position, to separate one or both shoulders, and the head may then be readily brought out.

It is not uncommon for the tail alone to be seen at the mouth of the passage. This is a breech presentation, and a very dangerons one. The calf cannot be expelled by the natural throes of the mother, the doubling of the hind legs offering an insuperable obstacle; nor will it be possible for the fœtus to be turned in the womb. The hand must be introduced; one of the hocks searched out, and the noose end of a cord brought round it: next, the free end of the cord must be carried in and passed through the noose, which is to be tightened and fixed above the hock. The operator must then press against the breech, forcing the calf backwards and upwards, while the assistants draw the hock to the commencement of the passage by means of the cords. The surgeon should then shift his hand down to the hoof in order to guard the uterus, as the foot is brought over the ridge of the pelvis. The other hock being afterwards drawn from under the fœtus in the same way, the birth may be easily accomplished.

The birth being effected, the practitioner should examine the womb in order to ascertain the state of the placenta, and whether there is a second calf. The cases of twins will not often give the practitioner much trouble, for the calves are generally small and easily brought through the passage, unless they should both present themselves at the same time; therefore, at the commencement of every labour, the surgeon should carefully ascertain whether the parts presenting may not belong to two distinct calves; in which case one must be pushed back until the other is delivered, for in the attempt to extract them both together the mother and the calves would inevitably perish.

FREE-MARTINS.

The opinion has prevailed among breeders from time out of date, that when a cow produces two calves, one of them a bull-calf and the other a cow, the male may become a perfect and useful bull, but the female will be incapable of propagation, and will never show any desire for the bull. The curious name of *free-martin* has been given to this animal. That accurate inquirer, Mr. John Hunter, spared no pains or expense to ascertain the real foundation of this belief; and he availed himself of the opportunity of examining three of these free-martins. In all of them there was a greater or less deviation from the external form and appearance of the cow; and in the head and the horns some approach to those of the ox; while neither of them had shown any propensity to breed. The teats were smaller than is usual in the heifer; but the outward appearance of the bearing was the same.

They were slaughtered, and he examined the internal structure of the sexual parts: he found in all of them a greater or less deviation from the form of the female, and the addition of some of the organs peculiar to the male; and he ascertained that they were in fact *hermaphrodites*. His description of one of them is given in the subjoined note, and will be interesting to the veterinary and medical student.*

It is not then a mere vulgar error that the female twin is barren; and Mr. J. Hunter has very satisfactorily accounted for the reason of her being so.† On the other hand, there are several well-authenticated instances of these free-martins having bred. An anonymous writer in the 'Farmer's Magazine, for November, 1806,' describes a free-martin belonging to Mr. Buchan of Killintringham, that had a calf, and who was a handsome beast, with a well-placed udder, and was a good milker. The same gentleman, however, had another free-martin which never bred. Another writer in the same Magazine, November, 1807, says, 'on the 11th of November, 1804, a cow of mine brought forth two calves, one a bull, and the other a cow calf; and in spring last the female twin produced a very good male calf: yet a neighbour of mine assures me that a female twin belonging to him never would take the bull, and was sold on that account to the butcher at the age of four or five.'

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* 'Mr. Arbuthnot's free-martin, seven years old. The external parts were rather smaller than in the cow. The *vagina* passed on, as in the cow, to the opening of the *urethra*, and then it began to contract into a small canal which passed on to the division of the uterus into the two horns, each horn passed along the edge of the broad ligament laterally towards the *ovaria*.

'At the termination of these horns were placed both the *ovaria* and the *testicles*. Both were nearly of the same size, which was about as large as a small nutmeg. To the ovaria I could not find any Fallopian tube.

'To the testicles were *vasa deferentia*, but they were imperfect. The left one did not come near the testicle, the right one only came close to it, but did not terminate in the body called the *epididymis*. They were both pervious and opened into the vagina, near the opening of the urethra.

'On the posterior surface of the bladder, or between the *uterus* and bladder, were the two bags called *vesiculæ seminales* in the male, but much smaller than they are in the bull. The ducts opened along with the vasa deferentia. This animal then had a mixture of all the parts, but all of them were imperfect.'—Philosophical Transactions, vol. lxix. p. 289.

† It is singular that the Romans should have called their barren cows *tauræ*, as if they had something of the bull about them. Columella, lib. vi. cap. 22, speaks of '*tauræ* which occupy the place of fertile cows, and should be sent away.' Varro also, *De Re Rusticâ*, lib. ii. cap. 5, calls the barren cow *taura*. This would be a curious subject of inquiry.

It would hence appear that the rule is, and a very singular anomaly in natural history it is, that the female twin is barren, because she is an hermaphrodite; but in some cases, there not being this admixture of the organs of different sexes, or those of the female prevailing, she is capable of breeding.

There have been instances of the cow producing three calves at one birth, but they have been so rare that there has been no record of the procreative power of the female. The editor of the 'British Farmer's Magazine,' May, 1828, speaks of three calves being produced by a small cow of the mixed Alderney and Yorkshire breeds, which in size, shape, and make, were a fac-simile of each other, and between which the most minute observer could not detect a difference.

There is a more singular account in a French periodical. A cow produced nine calves at three successive births; four at first, all females, in 1817: three at the second, of which two were females, in 1818; and two females, in 1819. All these, except two at the first birth, were nursed by the mother.*

THE CÆSARIAN OPERATION.

Some practitioners have lately recommended, in desperate cases, the opening of the side of the mother, and the extraction of the calf. The circumstances must indeed be desperate which can justify such a procedure. If, at the very earliest period of parturition, the veterinary surgeon can ascertain that there is a malformation of the pelvis, which will render delivery in a manner impossible, and the breed is a valuable one, and the mother, with this malformation, would never again be useful as a breeding cow, and no violent attempts have been made to extract the fœtus—nothing has been done which could set up inflammation, or give a disposition to inflammatory action; or if it can be clearly ascertained that there is a deformity in the fœtus, an enlargement of the head, or a general bulkiness, which will forbid its being extracted either whole or piecemeal, the practitioner might be justified in attempting this serious operation; but in a later stage of the process, when the usual measures have been adopted—when the parts have been bruised and injured, and the animal has been fatigued and worn out, and the fœtus itself probably has not escaped injury, such an operation can scarcely be defended on any principle of science or humanity. The writer of this work has twice attempted the operation, but in neither case did he save either the mother or the calf; nor is he aware of any English veterinarian who has succeeded. There is an account of one successful case by M. Chretien,† but it is one only out of the several that he attempted, and he attempted this, because, on examination, he found that there was a hard tumour in the womb, which nearly half filled the cavity of the pelvis, and forbade the possibility of delivery.

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* Nouveau Bulletin des Sciences.

† Journ. Pratique, 1826, p. 221.

In such case the experiment was justifiable, and it must have been very gratifying to M. Chretien to have succeeded, but let not the dawn of veterinary science be clouded by the reckless infliction of torture on any of our quadruped slaves.

If a similar impossibility of delivery should occur in the practice of the veterinary surgeon; and equally justifying the experiment, the operation must be thus performed. The rumen must first be punctured at the flank, or some of the solution of the chloride of lime introduced, in order to get rid of any gas which it contains, and thus to bring the uterus better into view, and prevent as much as possible that pressure on it, and on the intestines, which will usually cause a troublesome and dangerous protrusion of them as soon as an incision is made into the belly. The animal is then to be thrown on the left side and properly secured; the right hind leg, being detached from the hobbles, must be brought as far backwards as possible, and fixed to some post or firm object, so as to leave the right flank as much exposed as it can be. Commencing about two inches before and a little below the haunch bone, an incision is now to be made through the skin, six or seven inches long, in a direction from above downwards, and from behind forwards, and this incision is afterwards to be carried through the skin, and the muscular wall of the flank. A bistoury being taken and two fingers introduced into the wound in order to protect the intestines, the wound is to be lengthened five or six inches more over the superior and middle part of the uterus.

At this moment, probably, a mass of small intestines may protrude; they must be put a little on one side, or supported by a cloth, and the operator must quickly search for the fore feet and head of the fœtus. An incision must be made through the uterus of sufficient length to extract the calf. which must be lifted from its bed, two ligatures passed round the cord, the cord divided between them, and the young one, if living consigned to the care of a stander by, to be conveyed away and taken care of. The placenta is now to be quickly yet gently detached, and taken away. The intestines are to be returned to their natural situation, the divided edges of the uterus brought together and retained by means of two er three sutures, the effused blood sponged out from the abdomen, and the muscular parietes likewise held together by sutures, and other sutures passed through the integuments. Dry soft lint is then to be placed over the incision, and retained on it by means of proper bandages, and the case treated as consisting of a serious wound. Some valuable observations on this operation will be found in the Dictionnaire de Méd. Vét., GASTRO-HYSTEROTOMIE.

EMBRYOTOMY.

In cases of malformation of the calf, or when, as now and then happens, the powers of nature seem to be suddenly exhausted, and no stimulus can rouse the womb again to action, the destruction of the fœtus, should it still live, and the removal of it piecemeal, is a far more humane method of proceeding, and much oftener successful. All that will be necessary will be a very small kind of pruning knife, already described, with the blade even a little more curved than those knives generally are, and that can be carried into the passage in the hollow of the hand with scarcely the possibility of wounding the cow. A case related by M. Thibeaudeau will best illustrate this operation.* 'I was consulted respecting a Breton cow twenty years old, which was unable to calve. I soon discovered the obstacle to the delivery. The fore limbs presented themselves as usual, but the head and neck were turned backwards, and fixed on the left side of the chest, while the fœtus lay on its right side on the inferior portion of the uterus.' M. Thiboudeau then relates the ineffectual efforts he made in order to bring the fœtus into a favourable position, and that he at length found that his only resource to save the mother was to cut in pieces the calf which was now dead. He afterwards describes the knife which he had manufactured for this purpose, and thus proceeds: 'I amputated the left shoulder of the fœtus, in spite of the difficulties which the position of the head and neck presented. Having withdrawn this limb, I made an incision through all the cartilages of the ribs, and laid open the chest through its whole extent, by means of which I was enabled to extract all the thoracic viscera. Thus having lessened the size of the calf, I was enabled, by pulling at the remaining fore-leg, to extract the fœtus without much resistance, although the head and neck were still bent upon the chest. The afterbirth was removed immediately afterwards. More recently I have employed the same instrument in operating upon a cow the neck of whose uterus was so constricted that the finger could scarcely be introduced; I divided the stricture, and saved both cow and calf.'

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* Veterinarian, June, 1831, p, 346.

INVERSION OF THE WOMB.

In the convulsive efforts in order to accomplish the expulsion of the fœtus, the womb itself sometimes closely follows the calf, and hangs from the bearing, as low as or lower than the hocks, in the form of a large red or violet coloured bag. This is called '*the downfall of the calf-bag*.' It should be returned as soon as possible, for there is usually great pressure on the neck of the womb, which impedes the circulation of the blood, and the protruded part quickly grows livid and black, and is covered with ulcerated spots, and becomes gangrenous and mortified; and this is rapidly increased by the injury which the womb sustains in the continual getting up and lying down of the cow in these cases.

The womb must first be cleansed from all the dirt which it may have gathered. If much swelling has taken place, and the bag looks thickened and gorged with blood, it should be lightly yet freely scarified, and the bleeding encouraged by warm fomentations. While this is done, it should be carefully ascertained whether there is any distension of the rumen, and if there is, either the common puncture for hoove should be made in the flank, or a dose of the solution of the chloride of lime administered. A distended rumen would form an almost insuperable obstacle to the return of the uterus. Two persons should now support the calf-bag by means of a strong yet soft cloth, while, if the placenta yet remains attached to it, a third person gently separates it at every point. It would be useless to attempt to return the womb until the cleansing is taken away, for the labour pains would return as violently as before. The operator will carefully remove the little collections, or bundles of blood-vessels, which belong to the fœtal portion of the placenta, and which are implanted into the cotyledons or fleshy excrescences, that, for some reason, never yet fully explained, grow upon the surface of the impregnated womb, and gradually disappear again after the birth of the calf. If much bleeding attends this process, the parts are to be washed with a weak mixture of spirit and water. The bleeding being a little stayed, and every thing that may have gathered round the calf-bag being removed, the assistants should raise the cloth, and bring the womb on a level with the bearing; while the surgeon, standing behind, and having his hand and arm well oiled, and a little oil having been likewise smeared over the womb generally, places his right hand, with the fingers bent or clenched, against the fundus or bottom—the very inferior and farther part of that cornu or division of the uterus which contained the fœtus, and forces it through the passage, and as far as he can into the belly; and there he retains it, while, with the other hand, he endeavours likewise to force up the smaller horn, and the mouth of the womb. He will find considerable difficulty in effecting this, for the strainings against him will often be immense, and sometimes when he thinks he has attained his object the whole will again be suddenly and violently expelled. A bleeding from the jugular, and the administration of a couple of drachms of opium, will materially lessen these spasmodic efforts. The surgeon must, in spite of fatigue, patiently persist in his labour until his object is accomplished; and he will be materially assisted in this by having the cow either standing, or so placed on straw that her hinder parts shall be considerably elevated.

The practitioner should be careful that the parts are returned as nearly as possible into their natural situation, and this he will easily ascertain by examination with the hand. Much of the after quietness of the animal, and the retention of the womb thus returned, will depend upon this.

Although the return of the parts to their natural situation may be tolerably clearly ascertained, yet it will be prudent to provide against a fresh access of pain and another expulsion of the uterus. For this purpose it has been usual to pass three or four stitches of small tape through the lips of the bearing; but this is a painful thing and sometimes difficult to accomplish; and the cases are not unfrequent when these stitches are torn out, and considerable laceration and inflammation ensue.

A collar should be passed round the neck of the cow, composed of the kind of web that encircles the neck of the horse when he is confined for certain operations: a girth of the same material is then put round the body behind the shoulders, and this is connected with the collar, under the brisket and over the shoulder, and on each side. A second girth is passed behind the first, and a little anterior to the udder, and connected with the first in the same way. To this, on one side, and level with the bearing, a piece of stout wrapping cloth or other strong material, twelve or sixteen inches wide, is sewed or fastened, and brought over the bearing, and attached to the girth on the other side in the same manner. A knot on each side will constitute the simplest fastening, and this pressing firmly on the bearing will effectually prevent the womb from again protruding. If it should be necessary, another piece may be carried from below the bearing over the udder to the second girth, and a corresponding one, slit in order to pass on each side of the tail, may reach from above the bearing to the upper part of the second bandage.

The cow should be kept as quiet as possible; warm mashes and warm gruel should be allowed; bleeding should again be resorted to, and small doses of opium administered if she should be restless, or the pains should return; but it will not be prudent during the first day to give either those fever medicines, as nitre and digitalis, which may have a diuretic effect and excite the urinary organs, or to bring on the straining effect of purging, by administering even a dose of saline medicine. Should twenty-four hours pass and the pains not return, the stitches may be withdrawn from the bearing, or the bandage removed.

RUPTURE OF THE UTERUS.

Another more serious evil sometimes accompanies inversions of the womb, namely, a laceration or rupture of that organ, effected either by the unusually strong contraction of the womb, or by the violence with which the feet of the calf are drawn forward in the unskilful treatment of false presentation, or by the general concussion which accompanies the expulsion of the womb. The laceration is sometimes a foot in length, and is generally found on one side, and not far from the bottom of the uterus.

The animal needs not to be abandoned even in such a case, although there will be considerably more difficulty in returning the womb, because the same pressure cannot be made with the doubled hand on the bottom of it, and that difficulty may be increased by the furious state of the beast suffering such intensity of pain, and the whole frame disordered by such an accident. No time should be lost in vain efforts to bring the lacerated parts together and secure them by stitches; but, the womb having been well cleaned, the placenta removed, and the bleeding somewhat stayed, it must be returned as well, and as speedily as can be managed, and the bandage applied, or the lips of the bearing secured by stitches: the cow should then be bled, and opiates administered. Nature will often do wonders here—the mischief will be repaired—the uterus will become whole again, and that without a tenth part of the fever that might be expected; and there are instances upon record in which the cow has suckled her calf, and produced another a twelvemonth afterwards.*

Rupture of the uterus may occur without protusion of the part, from the too powerful action of that organ. The symptoms are obscure—they have not yet been sufficiently observed. They would probably be gradual ceasing of the labour pains—coldness of the horns and ears and mouth—paleness of the mouth—a small and accelerated pulse—swelling of the belly, and the discharge of bloody, glairy, fetid matter from the shape, Nothing can be done in such a case.

PROTUSION OF THE BLADDER.

In long protracted labour, accompanied by pains unusually violent, the bladder has protruded. A practitioner mistook it for the water-bag, and punctured it. If the calf is not already born, it must be extracted as quickly as the case will admit, and that without scrupulous regard to the safety of the cow; for the protruded bladder can never be returned to its natural situation—in consequence of pain aud inconvenience the animal can never afterwards carry high condition, but will be a miserable and disgusting object as long as she lives.

RETENTION OF THE FŒTUS.

It may happen that the pains of parturition gradually abate, and at length cease. If the cow has been much exhausted or injured by the continuance of the labour, or the efforts made to relieve her, and the fœtus has been wounded or broken, and considerable inflammation and fever have been set up, she will probably die; but if she is no more exhausted than may be naturally expected, and the fever is slight, and she eats a little, she should not be abandoned.

Mr. King, sen., of Stanmore, relates an instructive case of this kind: —' A few years ago I was called to see a heifer which appeared to be rather losing condition, and which had been observed occasionally to void some offensive matter from the vagina. Before I could get to her, some portion of a calf's fore extremity came away. The owner was very apprehensive of her doing well, and earnestly pressed the extraction of the remainder of the fœtus.

' On examination I found the os uteri so small and contracted, that I could not pass my hand; and as the beast ate and drank, and was so little, either locally or constitutionally, disturbed, I persuaded him to leave her to nature, watching her in case of assistance being required. He consented, and, by degrees, and in detatched portions, the greater part, or perhaps the whole of the calf (she was not confined) came away, and she did well, and became fat, and was sent to Smithfied market.'*

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* Veterinarian, October, 1828. Rec. de Méd. Vét. 1828, p. 365, and 1833, p. 294.

The same gentleman relates another case which occurred in Stanmore some years previously. 'A cow, healthy, fine, and fat, was slaughtered. The uterus was found to contain the skeleton of a calf almost entire, all the soft parts having separated, and wholly escaped. Nothing of her history was known.'†

ATTENTION AFTER CALVING.

Parturition having been accomplished, the cow should be left quietly with the calf; the licking and cleaning of which, and the eating of the placenta, if it is soon discharged, will employ and amuse her. It is a cruel thing to separate the mother from the young so soon; the cow will pine, and will be deprived of that medicine which nature designed for her in the moisture which hangs about the calf, and even in the placenta itself; and the calf will lose that gentle friction and motion which helps to give it the immediate use of all its limbs, and which, in the language of Mr. Berry, 'increases the languid circulation of the blood, and produces a genial warmth in the half exhausted and chilled little animal.' A warm mash should be put before her, and warm gruel, or water from which some of the coldness has been taken off.‡ Two or three hours afterwards it will be prudent to give an aperient drink consisting of a pound of Epsom salts and two drachms of ginger. This may tend to prevent milk fever and garget in the udder. Attention should likewise be paid to the state of the udder. If the teats are sore, and the bag generally hard and tender, she should be gently but carefully milked three or four times every day. The natural, and the effectual preventive of this, however, is to let the calf suck her at least three times in the day if it is tied up in the cow-house, or to run with her in the pasture, and take the teat when it pleases. The tendency to inflammation of the udder is much diminished by the calf frequently sucking; or should the cow be feverish, nothing soothes or quiets her so much as the presence of the little one.

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* Veterinarian, January, 1834.

† There is an instance on record of the head of a calf (all the other parts having passed away unobserved) being retained in the womb eighteen months. Pains resembling those of parturition then came on. The veterinary surgeon, on examination, detected a hard round body which he mistook for a calculus, and which was so firmly imbedded in the womb that he was compelled to have recourse to a bistoury in order to detach it. In a fortnight she seemed to be well.—*Instruct. Vétér.* tom. iv. p. 265. A more singular case is related by M. Coquet, in the same work, vol. ii. p. 317. A farmer in the neighbourhood of Neufchatel purchased a cow that did not appear to be well;—her excrement was liquid, and she had excessive thirst; she gradually got worse, the appetite was lost, and the diarrhœa became more violent and offensive. On carefully examining the excrement, the farmer recognised pieces of bone. He sent for a veterinary surgeon, who picked out portions of ribs, bones of the leg, and an entire under jaw-bone. She died three weeks afterwards. The colon, at its last curvature, was very much enlarged; its walls were thickened, black, and gangrenous; and it was perforated on the inferior and right side; it contained a considerable mass of bones, particularly a pelvis, which, unable to follow the curvature of the intestine, had been imbedded there and had also nearly penetrated through the intestine. The womb at that place was hard and thickened, and engorged with blood; the peritoneum was also inflamed, and there was considerable bloody and purulent effusion in the belly. It was evident that, on the death of the fœtus, whether by accident or in the process of parturition, inflammation of the womb and the intestine had followed; adhesion had taken place between them; suppuration, perforation, and the passage of the fœtus from the one to the other—that portion of the intestine being placed under that cornu of the womb. The uterus, having got rid of that which it contained, closed and healed; but the bones of the fœtus gradually separating, and passing along the mucous coat of the intestine produced a constant state of irritation, and at length the pelvis becoming imbedded there, a degree of inflammation was set up which speedily destroyed the animal.

‡ Can any thing be more unnatural, absurd or dangerous, than the following directions? 'After a cow has calved, it is advisable to let her have an opportunity of drinking as much *cold* water as she will, but by no means *warm* water; the latter opening the pores and letting in cold air: warm water is diluting, cold is bracing. It may be observed, that when cows calve in pastures, if there be water in the place, they are almost sure to calve near it. Nature has taught them what they want. By drinking much cold water their urine is increased, and the continual straining to void it causes them to force their cleansing.'—Parkinson's Treatise on Live Stock, vol. i. p. 1120.

THE CLEANSING.

The placenta, or *after-birth*, or *cleansing*, should be discharged soon after the calving. It soon begins to act upon the uterus as a foreign body, producing irritation and fever; it likewise rapidly becomes putrid and noisome, and if it is then retained long, it is either an indication of a weakly state of the cow, or it may produce a certain degree of low fever that will interfere with her condition. Every cowleech, therefore, has his cleansing drink ready to administer; but it is too often composed of stimulating and injurious drugs, and which lay the foundation for after disease. The aperient drink recommended to be given after calving, with the addition of half a pint of good ale to it, will be the best assistant in this case and the only thing that should be allowed.

Should the cleansing continue to be retained, some have recommended that a weight of six or eight ounces should be tied to the cord, the gentle and continual action of which will usually separate the placenta from its adhesions, without any risk of hemorrhage:* but if the after-birth should still remain in the womb, and decomposition should evidently commence, the hand must be introduced into the passage, and the separation accomplished as gently as possible.

There is, however, a great deal more fear about this retention of the after-birth than there needs to be, and it is only the actual appearance of inconvenience or disease resulting from it that would justify a mechanical attempt to extract it. It is occasionally retained seven or eight days without any dangerous consequence.

BLEEDING (FLOODING) FROM THE WOMB.

This, although rarely, may follow natural parturition. It is oftener seen when the uterus has been wounded in the forcible extraction of the calf, and it still more frequently follows the long retention and mechanical separation of the after-birth. The application of cold to the loins will be most serviceable in this case. A pound of nitre should be dissolved in a gallon of water, and the loins and bearing of the cow kept constantly by means of cloths dipped in the solution. If the season of the year will permit, the water yielded by the melting of pounded ice mixed with salt may be used, being colder, and therefore more effectual. The cow may now drink cold water, and in any quantity that she may be inclined to take, and large doses of opium (two drachms every second hour) should be administered. The hinder parts of the cow should be elevated, in order that the blood may be retained in the womb, and coagulate there. She should be kept perfectly quiet, and the calf not permitted to suck. There are few hemorrhages from the womb, except those produced by absolute rupture of it, which will not yield to this treatment.

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* There is no objection to this method of proceeding when the after-birth is actually retained in the uterus longer than it should be, but the common notion of its preventing the return of the cord into the womb is absurd.

MILK (PUERPERAL) FEVER.—DROPPING AFTER CALVING.

Although parturition is a natural process, it is accompanied by a great deal of febrile excitement. The sudden transferring of powerful and accumulated action from one organ to another—from the womb to the udder—must cause a great deal of constitutional disturbance, as well as liability to local inflammation.

The bitch, a few days after pupping, pants, heaves, refuses her food, becomes delirious, convulsed, and, unless speedily relieved, dies.

The ewe, soon after lambing, heaves at the flanks, separates herself from the flock, reels, falls, and dies.

So the cow, after parturition, is subject to inflammation of some of the parts the functions of which are thus changed: it is mere local inflammation at first, but the system speedily sympathises, and puerperal fever appears. It is called *dropping after calving* because it follows that process, and one of the prominent symptoms of the complaint is the loss of power over the motion of the hind limbs, and consequent inability to stand. In a great number of cases, loss of feeling accompanies that of voluntary motion; and no sense of pain is evinced, although the cow is deeply pricked in her hind limbs.

There are few diseases which the farmer dreads more, and that for two reasons; the first is, that the animal now labours under a high degree of excitement, and every local inflammation, and particularly near the parts in which the sudden change of circulation and of function has taken place, assumes a peculiar character, and an intensity, obstinacy, and fatality, unknown at other times: the second reason is, that from his inattention to the animal, or his ignorance of the real nature of the diseases of cattle, he does not recognise this malady until its first and manageable state, that of fever, has passed, and the strength of the constitution has been undermined, and helpless debility has followed. The first symptom which he observes, or which the practitioner has generally the opportunity to observe, is the prostration of strength which violent fever always leaves behind it. The early deviations from health are unobserved by the agriculturist, and probably would not always attract the attention of the surgeon.

This disease is primarily inflammation of the womb, or of the peritoneum, but it afterwards assumes an intensity of character truly specific. The affection is originally that of some particular viscus, but it soon is lost in a peculiar general inflammatory state, as rapid in its progress as it is violent in its nature, and speedily followed by a prostration of vital power that often bids defiance to every simulus.

Cows in high condition are most subject to an attack of puerperal fever. Their excess of condition or state of plethora disposes them to affections of an inflammatory character at all times, and more particularly when the constitution labours under the excitement accompanying parturition. The poorest and most miserable cattle have, however, sometimes dropped after calving; and they have particularly done so when, on account of the approach of this period, they have been moved from scanty to luxuriant pasture, or from low keep to high stall feeding.*

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* Mr. Hales very properly remarks, that, 'dropping after calving happens to cows that are very fresh and fat, and particularly to those that calve far on the season in hot weather; but cows that are too fat often drop after calving in the winter; and it is observed that the cases that occur in the winter will frequently recover, while the animals that are thus attacked in hot weather too generally die.'—*Veterinarian*, August, 1831.

Mr. Storry of Pickering very justly observes in a letter with which he favoured the

A cow is comparatively seldom attacked with milk fever at her first calving, because in the present system of breeding she has seldom attained her full growth, and therefore the additional nutriment goes to increase of size instead of becoming the foundation of disease. Cases, however, do occur, in which cows of three years old have been speedily carried off by this complaint, but then they had been most injudiciously exposed to the influence of the forcing system.

Much depends on the quantity of milk which the cow is accustomed to yield; and great milkers, although they are not often in high condition, are very subject to this affection. All cows have a slight degree of fever at this time; a very little addition to that will materially interfere with the secretion of milk, and, perhaps, arrest it altogether; and the throwing back upon the system the quantity of milk which some of them are disposed to give, must strangely add fuel to fire, and kindle a flame by which the powers of nature are speedily consumed. Whether the present improved method of selection, whereby the properties of grazing and giving milk are united in the same animal, will increase the tendency to inflammation, and particularly to this dangerous species of fever, is a question deserving of consideration. It used to be objected to the Short Horns, that they were more liable to puerperal fever than the Long Horns were; and that it was oftener fatal to them. Much of this arose from the unfounded prejudice which existed against the Short Horns, when they were first introduced; yet the principle which has just been hinted at should never be forgotten by the breeder of short-horned cattle, that in a disease the early and almost uniform system and the most dangerous part of which is the suppression of the secretion of milk, that danger must increase in proportion to the quantity of secretion thus suddenly arrested.

Puerperal fever sometimes appears as early as two hours after parturition; if four or five days have passed, the animal may generally be considered as safe: yet Mr. Leaver relates a case in which a fortnight elapsed between the calving and the dropping of the cow.*

The early symptoms of dropping after calving are evidently those of a febrile character. The animal is restless, shifting her feet, pawing, and she heaves laboriously at the flanks. The muzzle is dry and hot, the mouth open and the tongue protruded. The countenance is wild and the eyes staring. She wanders about mournfully lowing; she becomes irritable; she butts at a stranger and sometimes even at the herdsman. Delirium follows; she grates her teeth, foams at the mouth, throws her head violently about, and, not unfrequently, breaks her horns. The udder becomes enlarged, and hot, and tender, at the very commencement of the disease. This is always to be regarded as a suspicious circumstance in a cow at that time; and if this swelling and inflammation are accompanied, as they almost uniformly are, by a partial or total suspension of the milk, that which is about to happen is plain enough.

The disease is an inflammatory one, and must be treated as such, and being thus treated, it is generally subdued without difficulty. The animal should be bled, and the quantity of blood withdrawn should be regulated by that standard so often referred to—that rule without an exception—the impression made upon the circulation. From six to ten quarts will probably be taken away, depending upon the age and size of the animal,

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editor, that it often arises from the 'very comfortable drink' which so many cowleeches absurdly administer, before or after calving. In three cases which had occurred a little while before he wrote, he traced it to the freely giving of bean-meal to the cows on the day of parturition.

* Veterinarian, Aug. 1831.

before the desired effect is produced. There is no malady which more satisfactorily illustrates the necessity of endeavouring to subdue as quickly as possible every inflammatory complaint of cattle by the free use of the lancet; for all of them run their course with a rapidity which a person unaccustomed to these animals, and which the human practitioner especially, would scarcely deem to be possible. To-day the cow is seen with the symptoms just described—she is bled, and she is relieved; or she is neglected, and the fever has sapped the strength of the constitution, and left a fearful debility behind. The small bleedings to which some have recourse are worse than inefficient, for they only increase the natural tendency of these maladies to take on a low and fatal form.

A pound, or a pound and a half of Epsom salt, dependent on the size of the beast, must next be administered, with half the usual quantity of aromatic ingredients; and half-pound doses of the same must be repeated every six hours. Should not the medicine soon begin to act, the usual quantity of aromatic medicine must be doubled, for in addition to the constipation usually attending fever, there is that which arises from the occasional state of the rumen, and the passage leading to it, and that insensible stomach must be roused to action and excited to discharge its contents, in despite of the stimulating influence of the spice on the constitution generally. *The bowels must be opened*, or the disease will run its course; and, purging once established in an early stage, the fever will, in the majority of instances, rapidly subside, leaving the strength of the constitution untouched.*

After the physic has begun to operate, the usual sedative medicines should, if necessary, be given.

In a great number of cases, however, this all-important period will have passed away, and the practitioner will be called in to witness the fatal winding up of the affair, and perhaps to be censured for his want of skill, when he is unable to accomplish impossibilities.

The digestive function first of all fails when the secondary and low state of fever comes on. The rumen ceases to discharge its food, and that being retained, begins to ferment, and the paunch and the intestines are inflated with fœtid gas, and the belly of the animal swells rapidly.

Next, the nervous system is attacked—the cow begins to stagger. The weakness is principally referrible to the hinder quarters, and rapidly increases. She reels about for a while, and then falls; she gets up, falls once more, and at length is unable to rise; her head is bent back towards her side, and all her limbs are palsied; and now, when in too many cases no good can be done, the proprietor, for the first time, begins to be alarmed.

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* The following testimony of Mr. Bainbridge of Saffron-Walden to the general efficacy of this mode of treatment is too important to be omitted, although perhaps the extent to which he carried the bleeding might not always be justifiable. 'The months of February and March, 1833, afforded me several cases of dropping after calving. I immediately bleed to the amount of two gallons, or, in some cases, more, and give a draught composed of Epsom salts lb. i, spirits of nitre ℥ss., and linseed oil lb. i, in plenty of thin gruel. I also order from four to six ounces of salts to be given in gruel every six hours afterwards; some ginger being always boiled with the gruel. If my patient is not relieved in twenty-four hours, and her state permits it, I bleed again, and repeat the salts, oil, &c. Out of six cases in the last two months five perfectly recovered.'—*Veterinarian*, February, 1834, p. 74.

Mr. Friend considers this disease as closely connected with a disordered state of the digestive organs, and is a strenuous advocate for purgatives. He says, 'Epsom salts in large quantities, Croton seed and sulphur are most to be depended upon. The salts act immediately on the abdomen and intestines, and are excellent pioneers for the Croton, whose action is more upon the other stomachs, and consequently very valuable. I dare not depend upon either alone; on the salts, because they are apt to pass the three first stomachs too quickly; or on the Croton, because it is so much slower in its operation, and cannot be so immediately extended in its effects. In conjunction they will perform wonders. Common salt is an excellent medicine, but rather objectionable where milk is an object, it having a tendency to diminish the secretion of that fluid.'—*Veterinarian*, June, 1833.

This portion of the 'Farmer's Series' will not have been written in vain if it induces an earlier attention to the diseases of domesticated animals.

The duration of this second stage of puerperal fever is uncertain; but although it is usually more protracted than the first, the period in which hope may be reasonably encouraged is short indeed. If the cow is seriously ill, and off her feed, and does not get up again in two or three days, the chances are very much against her; the author, however, knew one that was saved after she had suffered considerable fever, and had been down nine days; and where debility is the principal symptom, and the cow seems to lie tolerably comfortable, and without pain, and picks a little, she may occasionally get up after she has been down even longer than that.

The treatment of this stage of the disease, although there has been a great deal of dispute about it, depends on one simple principle, the existence and the degree of fever. Notwithstanding there is debility, there may be fever; although the strength of the constitution may have been to a great degree wasted, there may be still a smothered fire that will presently break out afresh. In another point of view, much of this apparent weakness may be deceptive; it may be the result of oppression and venous congestion, and not of exhaustion.

The pulse will be the guide, and should be carefully consulted. Is it weak, wavering, irregular dying away, pausing a beat or two, and then weakly creeping on again? We must not bleed here. These are indications of debility that cannot be mistaken—nature wants to be supported, stimulated, not still further weakened. The abstraction of blood would settle the business at once.

Is the pulse small, but regular, hard, wiry, and quickened—or is it full and quickened? Blood should certainly be taken away. These are as plain indications of secret and destructive fire as can possibly be given. The practitioner should bleed, but with the finger on the pulse, anxiously watching the effect produced, and stopping at the first falter of the heart. Many a beast has been decidedly saved by this kind of bleeding in dropping after calving; and many have been lost through neglect of bleeding. Some may have perished when the bleeding was carried too far. and some, if the animals were bled when the pulse gave indications of debility, but none when the pulse indicated power, and the possibility of febrile action.

There is a great deal of disgraceful dispute about the propriety or impropriety of bleeding in dropping after calving. One practitioner affirms that he never bleeds, and another that he always bleeds in this disease. One thing, however, is certain, that when the proprietor, or attendant on the cattle, hazards a random or sweeping assertion in this case, either for or against bleeding, he stands in need of a great deal of information with regard to the diseases of cattle; and when a professional man commits himself in this way, he proves that he is perfectly ignorant of his business and ought to go to school again. The propriety and impropriety of the abstraction of blood depends on the state of the pulse and the degree of fever—circumstances which vary in every case, and in different stages of the same case, and which accurate observation alone can determine.

Next, in order of time, and first of all in importance in this stage of the disease, stands physic. The bowels must be opened, otherwise the animal will perish; but the fever having been subdued by a judicious bleeding, and the bowels after that being excited to action, the recovery is in a manner assured. The medicine should be active, and in sufficient quantity; for there is no time for trifling here. A scruple of the farina of the Croton-nut, and a pound of Epsom salt, will constitute a medium dose. For a large beast the quantity of the neutral salt should be increased. Doses of half a pound should afterwards be given every six hours until purgation is produced. The usual quantity of aromatic medicine should be added. Here, too, the constitution of the stomachs of cattle should not be forgotten. If twenty-four hours have passed, and purging has not commenced, even after the administration of such a drug as the Croton-nut, there is reason to suspect that the greater part of our medicine has not got beyond the rumen; and on account of the cuticular and comparatively insensible lining of this stomach strong stimulants must now be added to the purgative medicine, in order to induce it to contract upon and expel its contents. Two drachms each of ginger, gentian, and caraway powder, with half a pint of old ale, may, with advantage, be given with each dose of the physic.

It would seem superfluous to recommend the diligent use of injections in order to hasten the operation of the medicine, had not some of the writers on cattle-medicine strangely objected to them.* Warm water, with Epsom salt dissolved in it, or warm soap and water, will form the best injection, and should be thrown up frequently, and in considerable quantities.

Should the constipation obstinately continue, it may be worth while to inject a considerable quantity of warm water into the rumen, and thus soften and dissolve the hard mass of undigested food, and permit the medicine to come more effectually into contact with the coats of the stomach. The warm water would also stimulate the stomach to contract, and thus get rid of a portion of its contents, either by vomiting or purging. In the first case, there would be room for the exhibition of more purgative medicine; in the other, the effect most of all desired would have been obtained.

The rumen will often annoy the practitioner in another way in this complaint: either on account of a vitiated secretion in that stomach, or from the retention of the food, which, exposed to the united influence of warmth and moisture, begins to ferment, there will be considerable extrication of gas, and the animal will swell with even more rapidity and to a greater extent than in simple hoove. The flanks should immediately be punctured, or the probang introduced, in order to permit the carburetted hydrogen to escape. A dose of the solution of the chloride of lime, as already recommended under ‘Hoove,’ should be given to prevent the extrication of more gas; and a greater quantity of aromatic and fever medicine should be added to the purgative, that the stomach may be roused to healthy action.

Ere this the practitioner will have thought it necessary to pay some attention to the comfort of the patient. This part of medical treatment is too often neglected. She should have been watched before she actually dropped, and got as soon as possible into the house, and well and warmly littered up. If she drops in the field it will always be difficult to get her home; and if she continues out, and bad weather comes on, she will assuredly be lost. She should be placed on one side, or, if possible, on her belly, inclining a little to one side, and, as much as can be managed in her usual position, and with her fore parts a little elevated, and she should be secured in that position by trusses of straw. She should be moved or turned morning and night, in order to prevent soreness and excoriation. Warm gruel and water should be frequently offered to her, and if these are obstinately refused, she should be moderately drenched with thick gruel. Bean and malt mashes may be given with a little sweet hay: but it must be remembered, that while moderate nourishment is necessary to recruit her strength, and support her through such a disease, yet the digestive powers have usually shown that they have shared in the debility of the frame, and must not be too early, or too much taxed.

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* Mr. Knowlson has the following singular and ridiculous caution against the use of injections in dropping after calving:—‘Many are for giving clysters, and I have known them given in this complaint until the animal has been blown as full of wind as she could hold, which was the direct way to cure her, for the clysters and air must fill the bowels, and yet some of these people call themselves cow-doctors. It is difficult enough to prevent her swelling, without giving her so many clysters as to cause her to swell.’—P.

Having well opened the bowels and subdued the fever, the future proceedings of the surgeon must be regulated by the state of the patient. In general, little more will be necessary than attention to diet and comfort. At all events, tonics and stimulants should not be too hastily thrown in. It should be recollected, that the disease was essentially of a febrile nature. Experience will convince the practitioner, that there long remains a lurking tendency to the renewal of febrile action, and he will beware lest he kindles the fire afresh; but if the cow should continue in a low and weakly state, and especially if her remaining strength should seem to be gradually declining, gentian and ginger may be administered twice in the day, in doses of half an ounce of the first, and a quarter of an ounce of the second, and given in good sound ale; but the outrageous quantities of aromatics and bitters, and ardent spirits, that are occasionally given, cannot fail of being injurious.

It occasionally happens that the cow appears to recover a portion of strength in her fore-quarters, and makes many ineffectual attempts to rise, but the hind-quarters are comparatively powerless. This partial palsy of the hind extremities is the natural consequence both of inflammation of the womb and of the bowels. The best remedy is the charge which is generally applied to the horse. All embrocations are thrown away on the thick skin of the cow, and the constant stimulus of a charge and the mechanical support afforded by it, will alone effect the desired purpose. A week or ten days should be given to the animal, in order to see whether the power of voluntary motion in these limbs will return; but should the paralytic affection then remain, a sling must be contrived by which she may be supported, and during the use of which she may be enabled gradually to throw a portion of her weight on these legs, and reaccustom them to the discharge of their duty.

A very singular variety of the disease has already been hinted at. The cow is down, but there is apparently nothing more the matter with her than that she is unable to rise; she eats, and drinks, and ruminates as usual, and the evacuations are scarcely altered. In this state she continues from two days to a fortnight, and then she gets up well.*

There is a common consent among the different organs of the frame both under healthy and diseased action. It has been stated that a partial or total suppression of the secretion of milk is frequently an early symptom, and, in some stage or other, an almost invariable one of the disease. Experience likewise shows that if the secretion of milk can be recalled, the restoration of the use of the limbs is not far distant. The teats should be frequently drawn, and the discharge of milk industriously solicited. This is a simple method of cure, but it is a far more effectual one than many imagine.

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* Veterinarian, August, 1831.

That milk-fever is sometimes epidemic there is every reason to suppose. The practitioner may, perhaps, be long without a case, but if one comes under his notice, he has reason to suspect that it will soon be followed by others. The contagious character by which it is so fatally distinguished in the human subject is not, however, so decided; but this is a subject which well deserves further inquiry.

That there is a constitutional tendency to this complaint cannot be denied. Beasts in high condition are peculiarly subject to it; and an animal that has once experienced an attack of it becomes exceedingly liable to the disease at her next, or at some future calving. Agriculturists are perfectly aware of this; and if a cow recovers from puerperal fever, her milk is dried, and she is fattened and sold without much loss of time.

Something may be and is done by many graziers in the way of prevention. If the cow is in a high, and consequently a dangerous state of condition, and has been fed on luxuriant pasture, it will be very proper, as has been already stated, to bleed her, and give her a dose of physic; and remove her to a field of shorter bite, a little before her expected time of calving. Many valuable animals have been saved by this precaution.*

SORE TEATS.

Cows are very subject to inflammation of the udder soon after calving The new or increased function which is now set up, and the sudden distension of the bag with milk produce tenderness and irritability of the udder, and particularly of the teats. This in some cases shows itself in the form of excoriations or sores, or small cracks or chaps, on the teats, and very troublesome they are. The discharge likewise from these cracks mingles with the milk. The cow suffers much pain in the act of milking, and is often unmanageable. Many a cow has been ruined, both as a quiet and a plentiful milker, by bad management when her teats have been sore. It is folly to have recourse to harsh treatment to compel her to submit to the infliction of pain in the act of milking, she will only become more violent, and probably become a kicker for life; if by soothing and kind treatment she cannot be induced to stand, nothing else will effect it. She will also form a habit of retaining her milk, and which very speedily and very materially reduce its quantity. The teats should be fomented with warm water, in order to clean them and get rid of a portion of the hardened scabbiness about them, the continuance of which is the cause of the greatest pain in the act of milking; and after the milking, the teats should be dressed with the following ointment:—Take an ounce of yellow wax, and three of lard, melt them together, and when they begin to get cool, well rub in a quarter of an ounce of sugar of lead and a drachm of alum finely powdered.

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* There are many absurd notions about this disease, prevailing in different districts, but none so ridiculous as M. Gellé describes as existing in La Vendée. A cow that he had attended, labouring under puerperal fever, died. The pretended medical man of the place declared that she had been killed by bleeding, and that there were hedgehogs which were the cause of her complaint, and which ought to have been taken away from her. If a cow in calf pastured, before the sun had risen, on any herb over which a hedgehog had passed, she would have a parcel of little hedgehogs in her womb with the calf. These wise men mistook the cotyledons found in the uterus of ruminants for little hedgehogs, and introduced the hand and tore them off without mercy as soon as the cow dropped.—Journal Pratique, 1826, p. 477.

GARGET.

Too often, however, the inflammation assumes another and worse character: it attacks the internal substance of the udder—one of the teats or the quarters becomes enlarged, hot, and tender—it soon begins to feel hard, it is knotty; it contains within it little distinct hardened tumours or kernels. In a short space of time, other teats, or other quarters probably assume the same character. The milk has coagulated in the bag to a certain degree, and it has caused local inflammation where it lodges. This occurs particularly in young cows after their first calving, and when they are in a somewhat too high condition, and it is usually attended by a greater or less degree of fever.

The most effectual remedy for this, in the early stage of the complaint, is a very simple one; the calf should be put to the mother, and it should suck and knock about the udder at its pleasure. In most cases this will relieve her from the too great flow of milk, and disperse all the lumps.

If the inflammation continues or increases, or the bag should be so tender that the mother will not permit the calf to suck; and especially should the fever evidently increase, and the cow refuse to eat, or cease to ruminate, and the milk become discoloured, and mixed with matter or with blood, the case must be taken seriously in hand. The cow should be bled; a dose of physic administered; the udder well fomented; the milk drawn gently, but completely off, at least twice in the day, and an ointment composed of the following ingredients, as thoroughly rubbed into the bag as the cow will permit. (Rub down an ounce of camphor, having poured a tea-spoonful of spirit of wine upon it; add an ounce of mercurial ointment, and half a pound of elder ointment, and well incorporate them together.) Let this be applied after every milking, the udder being well fomented with warm water, and the remains of the ointment washed off before the next milking.

If the disease does not speedily yield to this treatment, recourse must be had to iodine, which often has admirable effects in diminishing glandular enlargements. The only objection to iodine, and which renders it advisable to give the camphorated mercurial ointment a short trial, is that while, by its power of exciting the absorbents of the glands generally to action, it causes the dispersion of unnatural enlargements, it occasionally acts upon, and a little diminishes the gland itself. This, however, rarely happens to any considerable degree, and will not form a serious objection to its use when other means have failed. It should be applied externally in the form of an ointment (one part of the hydriodate of potash being well saturated with seven parts of lard,) one or two drachms of which should be rubbed into the diseased portion of the udder, every morning and night. At the same time the hydriodate may be given internally in doses gradually increased from six to twelve grains daily.

The udder should be frequently examined, for matter will soon begin to form in the centre of these indurations, and should be speedily evacuated lest it should burrow in various parts of the bag, and, when at length it does find its way to the surface and bursts through the skin, irregular ulcers should be formed, at all times difficult to heal, and sometimes involving the loss of more than one of the quarters. Whenever there is any appearance of suppuration having commenced, (a minute observation will enable the practitioner to discover the very spot at which the tumour is preparing to point,) the diseased part should be freely and deeply lanced, and an immense quantity of matter will often be discharged. It is generally bad practice to cut off the teat; not only is it afterwards missed in the milking, but the quantity of the milk is usually lessened to a greater or less degree.

Should the tumour have been left to break, a deep and ragged ulcer will then be formed, and must immediately be attended to, for the neighbouring part will be rapidly involved. Half of the bag has in some cases become mortified in a few days, and diseased portions have either dropped off, or it has been necessary to remove them in order to stop the spread of the gangrene. The chloride of lime is an invaluable application here. The wound should be well cleaned with warm water, and then a dilute solution of the chloride freely applied to every part of it; not only will the unpleasant smell from the ulcer be immediately got rid of, but its destructive progress will be arrested, and the wound will speedily take on a healthy character. When this is effected, recourse may be had to the Friar's balsam; but the occasional use of the chloride will be advantageous until the bag is perfectly healed.

Chronic indurations will sometimes remain after the inflammation of garget has been subdued; they will be somewhat tender, and they will always lessen the quantity of milk obtained from that quarter. The iodine will seldom fail of dispersing these tumours. The ointment just recommended should be well rubbed in twice every day, and if the enlargement does not speedily subside, the hydriodate should also be given internally. Mr. Christian, of Canterbury, and the author's friend, Mr. May, of Maldon, relate two cases of chronic garget, in one of which the induration had existed four months, and occupied two of the quarters, and was accompanied by the occasional discharge of blood; and in the other it had been observed more than a twelvemonth, and was increasing. An ointment was used by Mr. Christian, in the form of the iodine itself triturated with lard; and a liniment composed of the tincture of iodine with soot by Mr. May. In the course of three weeks, the udder was in both cases as well as if it never had been diseased.* The hydriodate of potash is, however, the most manageable and the most effectual preparation of iodine.

The causes of garget are various; the thoughtless and unfeeling exposure of the animal to cold and wet, at the time of, or soon after parturition, the neglect of physic or bleeding before calving, or suffering the cow to get into too high condition, are frequent causes. So powerful is the latter one, that instances are not unfrequent of cows, that have for some time been dried, and of heifers that have never yielded milk, having violent inflammation of the udder.† The hastily drying of the cow has given rise to indurations in the udder that have not easily been removed. An awkward manner of lying upon, and bruising the udder is an occasional cause; and a very frequent one is the careless habit of not milking the cow clean, but leaving a portion in the bag, and the best portion of the milk too, and which gradually becomes a source of irritation and inflammation in the part. Connected with this last cause is the necessity of the advice already given, to milk the cow as clean as possible at least twice in the day, during the existence and treatment of garget.

THE COW-POX.

The consideration of this disease may be conveniently introduced here.

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* It often happens to fattening cows, but more in certain districts than others, so much so, that on some marsh lands in the county of Lincoln, a cow cannot be fattened, nor even a heifer that has never given milk: an ox has there been known to exhibit symptoms of garget.—Parkinson on Live Cattle, vol. i. p. 245.

† Veterinarian, Jan. 1830, and May, 1833.

Cows are subject to two distinct species of pustular eruption on the teats. Little vesicles or bladders appear; they often differ considerably in size and form, and are filled with a purulent matter. In the course of a few days a scab forms upon them, which peels off, and the part underneath is sound. If the pustules are rubbed off in the act of milking, or in any other way, small ulcers are left, which are very sore, and sometimes difficult to heal.

The best treatment is washing and fomenting; a dose of physic, and the application of the ointment for sore teats recommended in page 552. The cause, like that of many other pustular eruptions, is unknown; except that it is contagious, and is readily communicated from the cow to the milker if the hand is not quite sound, and from the milker to other cows.

There is another kind of pustular eruption, of a more important character, and with which the preceding one has been confounded. It also consists of vesicles or bladders on the teats; but they are larger, round, with a little central depression; they are filled at first with a limpid fluid, which by degrees becomes opaque and purulent, and each of them is surrounded by a broad circle of inflammation. This is more decidedly a constitutional disease than the former. The cow exhibits evident symptoms of fever; she does not feed well; sometimes she ceases to ruminate, and the secretion of milk is usually diminished.

These pustules go through a similar process with the former ones—they dry up, and at length the scabs fall off leaving the skin beneath sound; but if they are broken before this, the ulcers are larger, deeper, of a more unhealthy character, and generally far more difficult to heal. This is the genuine cow-pox.

The treatment is nearly the same, except that being accompanied by more constitutional disturbance, an aperient is more necessary, and it may occasionally be prudent to abstract blood. The frequent application of a Goulard's lotion, with an equal portion of spirit of wine, will, at least in the early stage of the ulcer, be preferable to the ointment; but better than this, and until the ulcers are beginning to heal, will be the dilute solution of the chloride of lime. If the teats are washed with this before the cow is milked, it will go far towards preventing the communication of the disease.

There is some difficulty respecting the cause of this disease. It is as contagious as the other, and, perhaps, usually propagated by contact; but it occasionally appears when there does not seem to have been a possibility of contact, directly or indirectly, with any other animal previously similarly affected. It was the opinion of Jenner, and is still the opinion of many medical men, that the cow-pox originated from infection by the matter of *grease in horses*, and which had been conveyed to the teat of the cow by means of the unwashed hands of some one who had the care of the horses while he was occasionally employed in the dairy.* This, when brought to the test of experience, has been proved to be altogether erroneous. A pustular disease has been communicated by contact with the matter of grease, but it resembled far more the spurious vesicle that has been described in the last page than the genuine cow-pox. In a great many instances, however, nothing that could be considered as bearing any analogy to the true vaccine disease followed inoculation by the matter of grease. Woodville, Simmons, Professor Coleman of the Veterinary College, Bartholini, and others, failed entirely in producing cow-pox in this way; and Dr. Pearson very satisfactorily proved that the cow-pox was occasionally found in diseases where the attendants on the cows could have had no communication with greasy horses, nor, in fact, with any horses sick or well; and where the cows, likewise, had no access to pastures on which horses had fed for many years before. Whatever may still be the opinion of a few medical men, it will be difficult to find a veterinary surgeon whose life is spent amidst these diseases, and who ought to be well acquainted with their nature, causes, and effects, who believes that grease is the origin of cow-pox, or that there is the slightest connexion between them.*

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* 'He (Jenner) conceived the sanious fluid of the grease to be the original disease, and the cow-pox, in the cow itself, to be nothing more than a casual inoculation produced by the cows lying down in a meadow, where the affected horse had been previously feeding, and her udder coming in contact with the discharge which had dropped on the grass and lodged there; and he endeavoured to show the identity of the fluids by the identity of their effects, in respect of the small-pox.'—Dr. Mason Good's Study of Medicine, vol. iii. p. 59. Dr. George Gregory, in his 'Practice of Physic,' says, 'It has been rendered highly probable, that the cow-pox is only a secondary disease in cows; that originally it is an affection of the hoof of the horse, communicated to man directly or to him through the cow.'—p. 113.

The next interesting circumstance connected with this pustular eruption is, that the persons on whom it appeared were, for a considerable period, (it was once thought, during life,) protected from the small-pox. This was known among farmers from time immemorial, and that not only in England, and almost every part of the continent, but also in the New World. The majority of medical men, however, had regarded it as a mere popular error, and to no one, whom experience had convinced of the active protective power of the cow-pox, had it occurred to endeavour to ascertain, whether it might not be 'possible to propagate the affection by inoculation from one human being to another, and thus communicate security against small-pox at will.'

To the mind of Mr. Jenner, then a surgeon at Berkeley in Gloucestershire, the probability of accomplishing this, first presented itself. He spoke of it to his medical friends; but from every one of them he met with discouragement. They sportively threatened to banish him from their club, if he continued to tease them with his wild speculations. For more than twenty years he brooded on the subject, ere he could summon sufficient resolution to oppose himself to the ridicule of his friends and of the profession generally by making the decisive experiment. At length he inoculated a boy with the matter taken from the hands of a milkmaid, who had been infected by her master's cow. The disease was communicated, and with it the immunity which he expected. He multiplied his experiments, and he was successful in all of them; and, although his brethren and the public were slow to believe him, he at length established the power of vaccination, and proved himself to be one of the greatest benefactors to the human race that ever lived.† This account of the progress of vaccination is not out of place, since the prophylactic against that destructive scourge of the human race, the small-pox, was derived from the animal to the consideration of whose general and medical treatment this work is devoted; and some practitioners of no little eminence have recommended (and perhaps it deserves more consideration than has been given to it) a return* to the primary fountain for a recruit of power and energy after the lapse of a certain period, and the prosecution of a certain number of successive experiments.

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* See a very candid and satisfactory statement of the argument on both sides in Dictionnaire de Méd, et de Chirurgie Vét. par Hurtrel d'Arboval, EAUX AUX JAMBES.

† The following picture of what passed in his mind before he had quite accomplished his object cannot fail of being interesting to the reader. 'While the vaccine discovery was progressive, the joy felt at the prospect before me, of being the instrument destined to take away from the world one of its greatest calamities, blended with the fond hope of enjoying independence and domestic peace and happiness, were often so excessive, that in pursuing my favourite subject among the meadows, I have sometimes found myself in a kind of reverie. It is pleasant to me to recollect, that those reflections always ended in devout acknowledgment to that Being from whom this and all other blessings flow.'—Bacon's Life of Jenner.

CHAPTER XVIII.

THE GENERAL DISEASES AND MANAGEMENT OF CALVES.

The management of the calf, so far as the profit of the farmer is concerned, belongs to the work on 'British Husbandry,' this volume having relation to that only which is connected with health, or disease, or general welfare, or improvement. In whatever manner the calf is afterwards to be reared, it should remain with the mother for a few days after it is dropped, and until the milk can be used in the dairy. The little animal will thus derive the benefit of the first milk, that to which nature has given an aperient property, in order that the black and glutinous fæces that had been accumulating in the intestines, during the latter months of the fœtal state might be carried off. The farmer acts wrongly when he throws away, as he is too much in the habit of doing, *the beastings*, or first milk of the cow.

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* Good's Studies of Medicine, vol. iii. p. 55; Gregory's Report, April, 1821. It was the opinion of Jenner, and it is still the belief of some sportsmen, that the cow-pox is a preventive against the distemper in dogs. It might be observed, that there is not the slightest similarity between the two diseases, but that, on the contrary, they affect perfectly different textures; it might also be urged that the description given of the distemper in dogs, by the advocates of the power of vaccination, is altogether so erroneous that no dependence can be placed upon it; the most satisfactory appeal, however, is to fact.

There is very great caprice with regard to the contagiousness of distemper, whether depending on certain modifications of the disease; or a certain degree of predisposition of the want of it in the animal exposed to the contagion; or on different states of atmospheric influence, The reason of it has never been sufficiently explained, but the fact admits of no denial, that during two or three successive years there may be isolated cases of it in a certain kennel, but the inhabitants of that kennel generally seem to possess a kind of immunity against its power; but in other years, no sooner does the distemper appear, than it rapidly spreads among the dogs, and carries off the majority of them There is also no fact better known among sportsmen than that much of the susceptiblity of infection depends on the breed. Some dogs, bred too much *in and in*, can scarcely be reared at all, while in others the disease can scarcely be distinguished from common catarrh. It was probably at some of these periods of security, or the subjects of his experiments belonging to some of these privileged breeds, that Dr. Sacco of Milan inoculated two hundred and thirty dogs with vaccine matter, and only one of them afterwards had the distemper and died; and it was probably when the contagious influence of the disease was more powerful, or the breed predisposed to take on the disease in its most fearful character, that Dr. Valentin of Nancy lost from distemper two dogs out of three which he had previously inoculated with vaccine matter; and that Gohier was quite unsuccessful in obtaining an immunity against the disease. The author of this work has inoculated more than sixty dogs, and the result of his experience is, that the vaccine matter neither destroys the contagion, nor mitigates the disease.

Numerous experiments were made on the effect of inoculation with the vaccine matter, in preventing or mitigating the scab in sheep, and the strangles in horses. The accounts given by the experimentalists are inconsistent to a degree scarcely credible; but public opinion seems to have decided that here too it was powerless. It was only in one of those moments of 'reverie' pardonable in a mind enthusiastically devoted to the pursuit of a benevolent and noble object, and when the 'wish is father' to many a conclusion, that it could be believed that the cow-pox would afford protection against *rabies*.—Dict. de Méd et de Chirurgie Vét., VACCINATION.

NAVEL-ILL.

The calf being cleaned, and having begun to suck, the navel-string should be examined. Perhaps it may continue slowly to bleed. In this case a ligature should be passed round it closer, but, if it can be avoided, not quite close to the belly. Possibly the spot at which the division of the cord took place may be more than usually sore. A pledget of tow well wetted with Friar's balsam should be placed over it, confined with a bandage, and changed every morning and night, but the caustic applications, that are so frequently restored to, should be avoided.

Sometimes when there has been previous bleeding, and especially if the caustic has been used to arrest the hemorrhage, and at other times when all things have seemed to have been going on well, inflammation suddenly appears about the navel between the third, and eighth, or tenth day. There is a little swelling of the part, but with more redness and tenderness than such a degree of enlargement would indicate. Although there may be nothing in the first appearance of this to excite alarm, the navel-ill is a far more serious business than some imagine. Mr. Sitwell, an intelligent breeder at Barmoor Castle in Northumberland, says, 'that in his part of the country, as soon as the calf takes on this disease, they consider it as dead; and butchers and graziers will not purchase any calves until the usual time for having the disorder is passed.'* Fomentation of the part in order to disperse the tumour—the opening of it with a lancet if it evidently *points*, and the administration of two or three two-ounce doses of castor oil, made into an emulsion by means of an egg, will constitute the first treatment; but if, when the inflammation abates, extreme weakness should come on, as is too often the case, gentian and laudanum, with, perhaps, a small quantity of port wine, should be administered.

CONSTIPATION.

If the first milk or *beastings* has been taken from the calf, and constipation, from that, or from any other cause, succeeds, an aperient should be administered without delay. The sticky black fæces, with which the bowels of the newly born-calf are often loaded, must be got rid of. Castor oil is the safest and the most effectual aperient for so young an animal. It should be given, mixed up with the yolk of an egg, or in thick gruel, in doses of two or three ounces; and even at this early age, the carminative which forms so usual and indispensable an ingredient in the physic of cattle must not be omitted—a scruple of ginger should be added to the oil.

Constipation of another kind may be prevented, but rarely cured. If the weather will permit, and the cow is turned out during the day, and the calf with her, the young one may suck as often and as much as it pleases—the exercise which it takes with its mother, and the small quantity of green meat which it soon begins to crop, will keep it healthy; but if it is under shelter with its dam, and lies quiet and sleepy the greater part of the day, some restraint must be put upon it. It must be tied in a corner of the hovel and not permitted to suck more than three times during the day, otherwise it will take more milk than its weak digestive powers will be able to dispose of, and which will coagulate, and form a hardened mass, and fill the stomach and destroy the animal. The quantity of this hardened curd which has sometimes been taken from the fourth stomach almost exceeds belief. This is particularly the case when a foster mother, that probably had calved several weeks before, is given to the little one, or the calf has too early been fed with the common milk of the dairy. The only chance of success in this disease lies in the frequent administration (by means of the stomach-pump, or the drink poured gently down from a small horn) of plenty of warm water, two ounces of Epsom salt being dissolved in the quantity used at each administration.

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* British Farmer's Magazine.

At a later period, the calf is sometimes suffered to feed too plentifully on hay, before the manyplus has acquired sufficient power to grind down the fibrous portions of it. This will be indicated by dulness, fever, enlargement of the belly, and the cessation of rumination, but no expression of extreme pain. The course pursued must be the same. The manyplus must be emptied either by washing it out, by the frequent passage of warm water through it, or by stimulating it to greater action, through the means of the sympathetic influence of a purgative on the fourth stomach, and the intestinal canal.

A tendency to costiveness in a calf should be obviated as speedily as possible—it is inconsistent with the natural and profitable thriving of the animal, and it can never long exist without inducing a degree of fever, always dangerous, and generally fatal. The farmer is sadly inattentive here, and loses many of his best young stock, for they are generally the most disposed to costiveness.

DIARRHŒA.

The disease, however, to which calves are most liable, and which is most fatal to them, is purging. It arises from various causes—the milk of the mother may not agree with the young one; it may be of too poor a nature, and then it produces that disposition to acidity, which is so easily excited in the fourth stomach, and the intestines of the calf; or, on the other hand, it may be too old and rich, and the stomach, weakened by the attempt to convert it into healthy chyle, secretes or permits the development of an acid fluid. It is the result of starvation and of excess—it is the almost necessary consequence of a sudden change of diet; in fact, it is occasionally produced by every thing that deranges the process of healthy digestion.

The farmer needs not to be alarmed although the fæces should become thin, and continue so during two or three days, if the animal is as lively as usual, and feeds as he was wont; but if he begins to droop, if he refuses his food, if rumination ceases, and he is in evident pain, and mucus, and perhaps blood, begin to mingle with the dung, and that is far more fœtid than in its natural state, not an hour should be lost. The proper treatment has already been described under the titles of diarrhœa and dysentery, pp. 475, et seq. A mild purgative (two ounces of castor oil, or three of Epsom salt) should first be administered, to carry away the cause of the disturbed state of the bowels. To this should follow anodyne and astringent and alkaline medicines, with a mild carminative. The whole will consist of opium, catechu, chalk, and ginger. The union of these constitutes the medicine known under the name of the 'Calves' Cordial;' but the carminative generally exists in unnecessary and dangerous proportions. The proportions of each have already been given in p. 476, when describing the treatment of diarrhœa. The use of this mixture should be accompanied by frequent drenching with starch or thick gruel; by the removal of green or acescent food, and by giving bran mashes, with a little pea or bean flour.

HOOSE.

A sufficiently alarming view has been given of this disease in adult cattle, but calves are even more subject to it: it takes on in them a more dangerous character, and more speedily terminates in wasting and in death. Hoose often assumes an epidemic form in cattle of a twelvemonth old and upwards; it often appears as an epidemic among calves, and carries off great numbers of them. The treatment recommended for grown cattle under the article Hoose, in p. 378 et seq., should, with such deviation as the different age and situation of the beast require, be adopted here. The bleeding, perhaps, should not be carried to so great an extent, and even somewhat more attention should be paid to the comfort of the animal.

CASTRATION.

There used to be a strange difference of opinion among farmers as to the time when this operation should be performed. In some parts of the north of the kingdom it is delayed until the animal is two years old; but this is done to the manifest injury of his form, his size, his propensity to fatten, the quality of his meat, and his docility and general usefulness as a working ox. The period which is now pretty generally selected is between the first and third months. The nearer it is to the expiration of the first month, the less danger attends the operation.

Some persons prepare the animals by the administration of a dose of physic; but others proceed at once to the operation when it best suits their convenience, or that of the farmer. Care, however, should be taken that the young animal is in perfect health. The mode formerly practised was simple enough:—a piece of whipcord was tied as tightly as possible round the scrotum. The supply of blood being thus completely cut off, the bag and its contents soon became livid and dead, and were suffered to hang, by some careless operators, until they dropped off, or were cut off on the second or third day.

It is now, however, the general practice to grasp the scrotum in the hand, between the testicles and the belly, and to make an incision on one side of it, near the bottom, of sufficient depth to penetrate through the inner covering of the testicle, and long enough to admit of its escape. The testicle immediately bursts from its bag, and is seen hanging by its cord.

The careless or brutal operator now firmly ties a piece of small string round the cord, and having thus stopped the circulation, cuts through the cord half an inch below the ligature, and removes the testicle. He, however, who has any feeling for the poor animal on which he is operating, considers that the only use of the ligature is to compress the blood-vessels and prevent after hemorrhage, and therefore saves a great deal of unnecessary torture, by including them alone in the ligature, and afterwards dividing the rest of the cord. The other testicle is proceeded with in the same way, and the operation is complete. The length of the cord should be so contrived that it shall immediately retract into the scrotum, but not higher, while the ends of the string hang out through the wounds. In the course of about a week the strings will usually drop off, and the wounds will speedily heal. It will be rarely that any application to the scrotum will be necessary, except fomentation of it, if much swelling should ensue.

A few, but their practice cannot be justified, seize the testicle as soon as it escapes from the bag, and, pulling violently, break the cord and tear it out. It is certain that when a blood-vessel is thus ruptured, it forcibly contracts, and very little bleeding follows; but if the cord breaks high up and retracts into the belly, considerable inflammation has occasionally ensued, and the beast has been lost. This tearing of the cord may be practised on smaller animals, as pigs, or lambs, or rabbits; the vessels are small, and there is but little substance to be torn asunder:

but even there the knife, somewhat blunt, will be a more surgical and humane substitute. This laceration should never be permitted in the castration of the calf or the colt.

The application of *torsion*, or the twisting of the arteries by means of a pair of forceps which will firmly grasp them, promises to supersede every other mode of castration, both in the larger and the smaller domesticated animals. The spermatic artery is exposed, and seized with the forceps, which are then closed by a very simple mechanical contrivance; the vessel is drawn a little out from its surrounding tissue, the forceps are turned round seven or eight times, and the vessel liberated. It will be found perfectly closed; a small knot will have formed on its extremity; it will retract into the surrounding substance, and not a drop more blood will flow from it: the cord may be then divided, and the bleeding from any little vessel arrested in the same way. Neither the application of the hot iron or of the wooden clams, whether with or without caustic, can be necessary in the castration of the calf.*

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* In many parts of France the bull-calf is castrated by means of a curious species of *torsion*, termed *bistournage*. The animal is thrown and secured; the operator places himself behind the animal, and opposite to the tail; he seizes the testicles with both his hands, and pushes them violently upwards and downwards several times, in order to destroy their adhesion to their coverings. He continues this manipulation until he thinks that he has produced sufficient lengthening of the cords, and dilatation of the bag itself; he then pushes up the left testicle as nearly as possible to the ring, leaving the right one low in the bag; he seizes the cord of the right testicle between the finger and thumb of the left hand, about an inch above the testicle, and grasping the bottom of the scrotum with his right hand, he turns the testicle, and pushes it forcibly upwards, until he has reversed it, and its inferior extremity is uppermost. Some little practice is required in order readily to effect this. Then, the right hand holding the testicle while the left hand raises the cord, the testicle is turned round from right to left four or five, or six times, until there is a degree of tension and difficulty in the turning, which indicates that the spermatic vessels are so far compressed or obliterated as to be deprived of the power of secreting or conveying the seminal fluid. The testicle is by this means brought up nearly to the abdominal ring, where it is retained by turning the scrotum over it, while the left testicle is brought down, reversed, and turned in the same manner. Last of all, in order to prevent the untwisting of the cords and the descent of the testicles, the operator grasps the bottom of the scrotum in his left hand, and holding one end of a piece of cord, eighteen inches in length, and about as large as a quill, between his teeth, and having the other end in his right hand, he makes with it several turns round the scrotum with considerable firmness below and close to the testicles, yet not so tightly as quite to stop the circulation of blood through the bag. This is taken away at the end of the second day, after which the testicles will remain fixed against the abdomen, and will gradually wither away. The animal is usually bled after the operation, and half of its allowance of food is for a while taken away, and it may be sent to pasture on the second or third day, if the weather is favourable.

This mode of castration does not appear to be very painful to the animal, and is rarely attended by any dangerous results. It is, however, principally adapted for young cattle; for when the muscle of the scrotum is powerful, especially in cold weather, and when there is much adhesion between the testicle and its surrounding tunics, the torsion of the testicle is scarcely practicable. The animals that are thus emasculated are said to preserve more of the form of the bull than others from whom the testicles are excised: they also retain more of the natural desires of the bull, and are occasionally very troublesome among the cows.—Dict. de Méd. et Chirurg. Vét. CASTRATION.

CHAPTER XVIII.

DISEASES OF THE MUSCULAR SYSTEM AND OF THE EXTREMITIES.

RHEUMATISM.

Although some writers have been strangely averse to acknowledge the existence of this disease in the horse, no farmer has a doubt of its frequent occurrence in cattle. It is inflammation of the fascia, or cellular coat of the muscles, and also of the ligaments and synovial membranes of the joints. If a cow has been necessarily, or carelessly or cruelly, exposed to unusual cold and wet, particularly after calving, or too soon after recovery from serious illness, she will often be perceived to droop. She becomes listless, unwilling to move, and by degrees gets off her feed. If urged to move, there is a marked stiffness in her action, at first referrible chiefly, or almost entirely, to the spine; and she walks as if all the articulations of the back and loins had lost their power of motion. She shrinks when pressed on the loins; and the stiffness gradually spreads to the fore or hind limbs. The farmer calls it *chine fellon;* if it gets a little worse, it acquires the name of *joint fellon*, and worse, unless care is taken, it speedily will become. Some of the joints swell: they are hot and tender; the animal can scarcely bend them; and he cannot move without difficulty and evident pain.

Who could doubt that the same causes which produce rheumatism in the human being will produce it also in the quadruped? Where is either the proof or the probability of exemption? Thus we find rheumatism in cattle chiefly prevalent in a cold, marshy country—in places exposed to the coldest winds—in spring and in autumn, when there is the greatest vicissitude of heat and cold—in animals that have been debilitated by insufficient diet, and that cannot withstand the influence of sudden changes of temperature—in old cattle particularly, and such as have been worked hard, and then turned out into the cold air, with the perspiration still hanging about them.

It seems to assume the acute and the chronic form as evidently as it does in the human being. One animal will labour under considerable fever; he will scarcely be able to move at all, or when he does, it extorts from him an expression of suffering. Another seems to be gay and well, when the air is warm and dry; but as soon as the wind shifts, or immediately before it changes, he is uneasy, and comparatively helpless. On some portions of a farm, nothing seems to ail the cattle; on others, lower, moister, or more exposed, the cattle crawl about stiffly and in pain. In some extreme cases, the quantity of milk rapidly diminishes, and the cow wastes away and becomes a mere skeleton.

The rheumatism in cattle, as in the human subject, may be palliated, but rarely removed. The treatment of it consists in making the animal comfortable—in sheltering her from the causes of the complaint—in giving her a warm aperient, which, while it acts upon the bowels, may determine to the skin, as sulphur, with the full quantity of ginger. The practitioner will afterwards give that which will yet more determine to the skin, as antimonial powder, combined with an anodyne medicine, almost any preparation of opium;—and he will have recourse to an embrocation stimulating to the skin, and thus probably relieving the deeper seated pain, as camphorated oil, or spirit of turpentine and laudanum.

SWELLINGS OF THE JOINTS.

These are usually the consequence of rheumatism. Small tumours appear in the neighbourhood of the joints that were most affected. They seem at first to belong to the muscles; but they increase: they involve the tendons of the muscles, and then the ligaments of the joints, and the lining membrane of the joints. When this is the case, other diseases are at hand—inflammation of the lungs or bowels; but, oftenest of all, rheumatism degenerates into palsy.*

The superficial veins in the neighbourhood of the joints sometimes become full and large; they grow decidedly varicose. When the causes of rheumatism are removed, the situation of the animal changed, and the weather has become more congenial, the lameness decreases, the swellings diminish, but the varicose veins remain.

The enlargements of the joints connected with, or the consequences of rheumatism are removed—but in the majority of cases only temporarily—by stimulating embrocations, of which spirit of turpentine or the compound one of turpentine, ammonia, camphorated spirit, and laudanum, is the most effectual. Some, however, will not disappear without the application of the cautery.

There are other tumours about the joints, and particularly the knees of cattle, which are not necessarily connected with rheumatism, and in many cases quite independent of it, although they are found only in beasts that are out at pasture.

They are of two kinds. The first occupies the fore-part of the knee, and generally one knee at a time. A fluid collects in the tissue immediately beneath the skin, and which yields to the pressure of the finger. The pressure causes no pain, nor is there any inflammation of the skin, but there is some degree of lameness. The tumours insensibly increase; they still contain a fluid. Inflammation is now sufficiently evident: the lameness is very great; the animal is incapable of work, and the motion of the joint is almost destroyed.

Frictions with turpentine and hartshorn are often employed: sometimes one composed of tincture of cantharides is used. These occasionally disperse the tumours for a while, but they speedily re-appear. The budding iron is a more effectual remedy. If the tumour is pierced with it, a glairy fluid escapes, and the swelling subsides. A blister should then be applied, and the animal kept in the cow-house. The tumour does not often return, but it is a considerable time before the lameness quite disappears.

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* Mr. Tait of Portsoy gives an interesting account of these affections of the joints, under the designation of '*Crochles.*' He says that the early symptoms are pains in the feet, and particularly the fore-feet, with enlargement of the joints; the hind quarters particularly becoming so weak and contracted that the animal can scarcely stand; and sometimes she lies for many weeks without the power of moving. If she is neglected she certainly dies; and then the cartilages of the joints are always ulcerated, and sometimes nearly destroyed. Mr. Tait has no faith in any medicine or external application; but he believes that the removal of the animal to a more comfortable situation, and particularly to a drier pasture, will, in the early stages of the complaint, be attended with decided good effect. It is a very simple remedy, and is worth a trial.

A brother practitioner related a very curious anecdote of the occasional treatment of this disease, which Mr. Tait gives in his own words:—'Soon after commencing practice in this district, I was particularly struck with the appearance of a cow belonging to a cottar. On inquiring into the cause of the animal's apparent helplessness, my informant stated to me that 'she had had the crochles, but was now in a way of getting better, a man having pared out the worm that was the cause of the awful complaint; that the man knew the very spot where the worm lodged, and that he appeared to have great experience, having travelled much as a *beggar.*' In fact, he had sawn off two inches from each claw of her feet. The cow was in a woful plight; her joints enlarged, her muscles shrunk, and her skin clinging to her bones."

After remonstrating with the cottar on his folly, Mr. Tait's friend persuaded the cottar to remove her to a farm which the disease had never visited. The animal in a very short time began to move about, and would have become perfectly sound, had not 'the beggar' removed a part of the bones of her feet along with the worm.—Veterinarian, August, 1834.

A more frequent species of tumour is of a hard character. It does not yield at all to pressure; it evidently causes considerable pain, and the animal is very lame. These tumours are almost invariably confined to one knee. Here, neither frictions nor perforation with the budding-iron will be of material benefit, although deep firing has sometimes succeeded.

Other tumours, sometimes immediately on the joints, and at other times at a greater or less distance from them, and of variable degrees of hardness; sometimes adhering to and identified with the substance beneath, and at other times more or less pendulous, do not appear to give much pain to the animal, nor do they often interfere with the motion of the joints, but they are a great eyesore, and, in a few instances, they suddenly take on a disposition to increase with great rapidity. These have been blistered without effect—setons have been passed through them with variable result, and occasionally recourse has been had to excision.

Some surgeons have very lately begun to treat them with iodine; the ointment of the hydriodate of potash has been well rubbed into the tumours and the neighbouring parts; and the hydriodate has at the same time been administered internally. The success of this treatment with the two last species of tumours, has been almost as great as the practitioner could desire. They have uniformly very much diminished in size; and in the great majority of cases they have disappeared. The ointment should be composed as already recommended, and six grains of the hydriodate given morning and night in a mash. On the first species of tumour unconnected with rheumatism, the iodine has seldom had decided effect.

ULCERS ABOUT THE JOINTS.

These tumours sometimes assume very much the appearance of farcy in the horse. They run in lines, they follow the apparent course of the veins, but they belong to the absorbents. They frequently ulcerate—the wounds are painful, deep, and spreading. They have already been described (p. 313,) when the question of farcy in cattle was considered.

The dilute solution of the chloride of lime will form the best application, and will usually be successful; especially if occasionally aided by some caustic wash, as a solution of blue vitriol, or dilute nitric acid.

OPENED JOINTS.

These sometimes occur from the injudicious lancing of the first kind of tumour, but oftener from accident. The principle of the treatment of open joints is the same as was recommended in the 'Treatise on the Horse,' p. 242, namely, to close the orifice as soon as possible, and before the secretion of the joint oil is stopped, and the cartilages of the opposing bones rub on each other, and the delicate membrane which lines these cartilages becomes inflamed, and the animal suffers extreme torture, and a degree of fever ensues by which he is speedily destroyed. The wound is best closed by means of the firing iron. For a description of the operation the reader is referred to 'the Horse,' under the title 'Broken Knees.'

SPRAINS.

Working oxen, and those that have been driven long journeys, are liable to *sprain*, and particularly of the fetlock joint. The division of the lower part of the cannon or shank bone, in order that it may articulate with the two pasterns into which the leg is divided renders this joint particularly weak and susceptible of injury. The treatment is the same as in the horse, and consists of fomentation of the part, to which should succeed bandages very gradually increasing in tightness, cold lotions, and afterwards, if the deep-seated inflammation cannot otherwise be subdued, stimulating applications, blistering, or, as the last resource, firing. The inflammation attending sprain of this joint is often very great, and enormous bony enlargement and anchylosis are not unfrequently seen. They embrace the fetlock joint; they frequently include the pastern: but oftener, the inflammation and bony enlargement extend up the leg, and particularly the posterior part of it almost to the knee; for the division of the flexor tendons, in order to reach both toes, takes place considerably above the fetlock (the precise place varying in different animals,) and these, from the oblique direction which they take, are peculiarly liable to strain, with probability of serious injury. The firing iron must be severely applied before the mischief has proceeded to this extent.

DISEASES OF THE FEET.

These are numerous and serious. The leg of the ox is divided at the fetlock. There are two sets of pasterns, two coffin bones, and two hoofs to each leg. The shank-bone is double in the fœtus, but the cartilaginous substance between the two larger metacarpals is afterwards absorbed, and they become one bone; the lower bones, however, continue separate. Each division has its own ligaments and tendons, and is covered by its own integument. This gives rise to various inflammations and lamenesses, which have been confounded under the very objectionable term of

FOUL IN THE FOOT.

Hard and irritating substances often insinuate themselves between the claws, and becoming fixed there, and wounding the claws on one or both sides, become a source of great annoyance, pain, and inflammation, and the beast suddenly becomes lame, and the pasterns are much swelled. They should be carefully examined, the interposed substance should be removed, the wound washed thoroughly clean, and a pledget of tow dipped in friar's-balsam, or covered with healing ointment, introduced between the claws, and there confined by means of a roller. Lameness from this cause will, in general, be readily removed.

The foot being thus divided, and the ox unexpectedly treading on an uneven surface, or being compelled long to do so when ploughing a steep field, the weight of the animal will be unequally distributed on the pasterns, and severe sprain will be the result. This is indicated by the sudden lameness which comes on, and by the swelling and heat and tenderness being confined to one claw, and referrible to the fetlock or pastern, or coffin joints. Rest and fomentation, or the application of cold, with bleeding from the veins of the coronet will usually remove this kind of lameness. The bleeding may be easily effected by means of a small fleam or lancet, for the veins of the foot of the ox are larger and more tortuous than those of the horse, and rise more distinctly above the coronet, and climb up the pastern. It is the increased vascularity which often gives so serious a character to sprains of the coffin or pastern joints in the ox, and disposes to anchylosis of these joints much oftener than in the horse.

The foot of the ox, or that part which is inclosed within the horny box, is liable to the same injuries and diseases as that of the horse; but they generally are not so difficult to treat, nor do they produce such destructive consequences, because the weight of the animal being divided between the two claws, the first concussion or injury was not so great, and the animal was able afterwards to spare the injured claw, by throwing a considerable portion or the whole of the weight on the sound one. Injuries of the feet arise from pricking in shoeing, wounds from nails or glass, or from the sole being bruised, and sometimes the horn being worn almost through, by travelling or working on hard roads.

It is generally believed that there is a constitutional tendency to diseases of the foot in cattle, resembling the rot in sheep; but this has never been satisfactorily proved,* and the simplest explanation of the matter is, that inflammation was produced by some external cause; that it ran its usual course; that suppuration followed, and matter was formed; that it burrowed in various parts of the foot, and broke out at the coronet; that sinuses remained; that the ulcer took on an unhealthy character; fungus shooted up, in short there was the quittor or canker of the horse, but on a smaller scale and more manageable. This is a simple view of the case, and at once points out a mode of treatment, intelligible and generally successful.

It is true that *foul in the foot* is most prevalent in low marshy countries; but the hoof is there softened, macerated by its continual immersion in moisture, and rendered unable to resist the accidents to which it is occasionally exposed. It is there that canker and quittor are most prevalent in the horse, and most difficult to be treated.

When a beast becomes suddenly lame he should be taken up, and, if necessary, secured. The lameness will generally be referrible to one claw. The heat, and tenderness, and redness, and enlargement round the coronet will prove this. The foot should be carefully examined—is there any prick or wound about the sole? if so, let the horn be pared away there—let the matter which is pent up within escape—let the horn be removed as far as it has separated from the sensible parts beneath—let a little butyr of antimony be applied over the denuded part—let a pledget of soft dry tow be bound tightly upon the part, and let the animal be placed in a dry yard or cow-house.

If there is no evident wound, let the foot of the beast, like that of the horse, be tried round with the pincers; and if he decidedly flinches when pressed on a particular part, let the foot be opened there—let the coronet be closely examined—is there any soft reddish shot upon it? if so, freely plunge the lancet into it.

If the examiner is foiled in this attempt to discover the seat of mischief, let him envelop the foot in a poultice; that will soften the neighbouring parts, and cause even the horn to be a little more yielding, and will abate the inflammation; if it should be pure inflammation without previous mechanical injury, that will hasten the process of suppuration, and the matter will more quickly, and with less destruction to the neighbouring parts, find its way to the coronet. As soon as it does so, the soft projecting red or black spot should be opened, and a probe should be introduced into the opening and the sinuses carefully ascertained, and every portion of detached horn removed from above them, and the healthy horn around thinned and smoothed. It will always in these cases be prudent to administer a dose of Epsom salt.

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* M. Favre, of Geneva, instituted numerous experiments, in order to ascertain whether the foot-rot in sheep, and foul in the foot in cattle, were the same or similar diseases. He inoculated sheep with the matter taken from between the claws, and with some from the denuded surface of the sole, and some also which he had taken from a sinus running deep into the foot: in neither case did he produce any thing analogous to the foot-rot.—Journal de Méd. Vet. et Comparée, 1826, p. 319.

The character of the surface exposed should now be considered. If, the matter having been all evacuated, the wound or wounds have a tolerably healthy appearance a light application of the butyr of antimony, and that repeated daily, will soon induce a secretion of new horn; but if there is a portion of the surface that looks black or spongy, or the edges of which are separated from the parts around, here was, probably, the original seat of injury—the life of that portion has been destroyed and it must be removed—*it must slough out.* A poultice of linseed meal, with a fourth part of common turpentine, must be put on, changed twice in the day and continued until the separation is complete. A light application of the butyr should then follow, or in favourable cases, a pledget soaked in friar's balsam should be placed on the wound, bound tightly down, and daily renewed; the removal of every portion of detached horn, dryness, firm, but equable pressure on the part, and moderate stimulus of the exposed surface are the principles which will carry the practitioner successfully through every case of foul in the foot.

Nothing has been said of the fungous excrescence between the claws, in order to remove which, as well as to stimulate the surface beneath and dispose it to throw out healthy horn, the cart-rope or the horse-hair line used to be introduced between the claws, and drawn backwards and forwards, inflicting sad and unnecessary torture on the animal. This fungus will rarely make its appearance, if the horn, which had lost its attachment to the living surface beneath, yet still continue to press upon it, has been carefully removed. If any fungus appears, it should be levelled by means of a sharp-knife, and the caustic applied.* There can be no doubt, that pure inflammation, without wound or mechanical injury, does sometimes attack the feet of cattle, especially of those that are in high condition. On one day the beast is perfectly free from lameness, or illness of any kind; on the following day probably the foot is swelled, *the claws stand apart from each other*, they are unusually hot, and the animal can scarcely rest any portion of his weight on one foot: he is continually shifting his posture, or he lies down and cannot be induced to rise. If the beast is neglected, the inflammation and swelling increase until an ulcer appears at the division of the claws, and which cannot be healed until a considerable core has sloughed out.

A linseed-meal poultice should be applied to the part as soon as this inflammation is observed, and it may be easily retained in its situation by means of a cloth through which two holes have been cut to admit the claws. This will either abate the inflammation or hasten the suppuration; and as soon as the swelling begins to point it should be opened. The poultice must be continued until this sloughing process has taken place, or the ulcer begins to have a healthy surface, a little common turpentine having been added to it. Proud flesh must be subdued, by the caustic; equal parts of verdigris and sugar of lead will constitute the best application for this purpose. Foul and fœtid discharge must be corrected by the chloride of lime; and when the ulcer looks healthy, the tincture of myrrh or friar's balsam must be used.

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* The following recipe is copied as a perfect unique in veterinary practice;—'My father's method (of curing foul in the foot) was to cut up a sod where the diseased foot had trodden, and either turn it over sward side downwards, or hang it on a hedge in that position. I am unable to account for this cure; to me it is incomprehensible; but in all the experiments I have tried, this remedy, so simple and cheap, has proved the best. The first year I was at Slane, we had many cattle troubled with this complaint; I applied nothing else but what may be called a charm, and they all more readily recovered than when I used severer applications; therefore, in future, I mean never to have recourse to any remedy but the sod, though probably rest is the great restorative.' —Parkinson on Live Stock, vol. i. p. 245.

By this mode of treatment the disease will readily be subdued, but the application of corroding caustic substances in the early stage of it will add fuel to fire; and the suffering the abscess to remain unopened until the pus has burst its way through the thick skin of the leg will produce sinuses that will run in every direction, remain open month after month, and leave permanent lameness behind. Some have imagined that this variety of foul in the foot is contagious. That is not quite ascertained, although there are some suspicious cases on record; the farmer, therefore, will act prudently, who immediately separates the lame beast from the herd.

In one respect, these diseases of the feet of cattle differ materially from quittor or canker in the horse. There is a laminated connexion between the hoof of the ox and the sensible parts beneath as in the horse; but the horny plates of the hoof and the fleshy ones of the substance which covers the coffin-bone are not so wide or so deep, and therefore the attachment between the hoof and the foot is not so strong. Thence it happens that the matter finds great difficulty in forcing a way for itself in the foot of the horse and deep sinuses are formed which reach to, and corrode the bone, and there is sometimes core upon core to be detached, and portions of bone to be thrown off, and whence results the cankered state of the foot, and the difficulty of cure. In cattle less resistance to the progress of the matter is experienced; the hoof is more easily separated from the parts beneath, and that which would produce deep ulceration and caries in the one, rarely to be perfectly repaired, leads to the casting of the hoof in the other, while the foot has received comparatively little injury. The form of the foot, in these cases, is much changed, and all its functions impaired in the one; in the other a new hoof speedily covers a foot that has escaped all serious detriment, and the animal becomes as useful as he ever was. Cases, however, do sometimes occur in which the hoof is lengthened and curved, and twisted in a very curious way, and the coffin bone takes on a similar distortion.

There is no *frog* in the foot of cattle, nor are there the provisions for the expansion and elasticity of the foot which we admire in the horse; therefore there is not any disease that can be considered as corresponding with the '*thrush*' in that animal, but there is occasionally something not much unlike *grease*. A sore appears upon the heel, not however so much in the form of a crack as of a circular superficial ulcer. It has a brown unhealthy hue; fungus often springs from it,* and it causes considerable lameness. It is best treated with the chloride of lime, or that and a strong solution of alum may be alternately applied. A bandage should seldom be used because it can scarcely be put on without excoriating the parts and increasing the evil, and because the ox is much more impatient of the restraint of the bandage than is the most fidgetty or vicious horse.

Constant pain seems to prey more speedily and injuriously on cattle than on the horse—ruminants have not the courage and endurance of this noble animal, and therefore it is that these diseases of the feet soon begin very materially to interfere with the condition of the beast. It has been remarked (p. 304,) that 'there is not a farmer that has not had cows in his dairy that have lost for a time full half of their milk on account of the pain which tender and diseased feet have occasioned; the grazier sometimes loses the advantage of three or four months' feeding from the same cause, and in London dairies tender feet are often a most serious ailment, and compel the milkman to part with some of his best cows, and that in very indifferent condition.' These things would indicate the propriety of having recourse to the operation of neurotomy. It is an operation which, resorted to in proper cases, will never be undervalued as it regards the horse; and the time is not far distant, when veterinary surgeons, better instructed in the anatomy and ailments of cattle, will often practise it to relieve the torture, and to improve the condition of ruminants.

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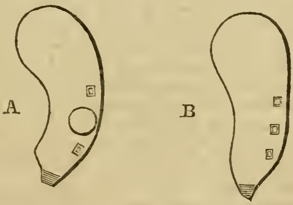
* Where the case has been neglected, projection of the fungus sometimes hardens and acquires a resemblance to the *grapes* on the heels of greasy horses; more frequently, however, it becomes like a seedy wart, and is very tender and troublesome, and bleeds after the slightest touch. The chloride or butyr of antimony is the best remedy for this.

SHOEING.

This, as in the horse, is a necessary evil. A beast used for road work would soon be crippled and ruined without shoes; and the farmer would find it his interest never to send an ox to plough unshod. He would be well repaid for the expense of shoeing by the increased speed, the greater capability of work, the endurance and the superior condition of his cattle. Little skill is required in the smith in order to adapt the shoe to the foot of the ox; there is no weakness of particular parts, no corn, no tenderness of frog, no disposition to contraction to be studied; the simple principle is to cover the sole effectually. Around the outer rim the shoe should follow the line of the foot—it should somewhat project inwardly towards the toe, and be rounded towards the heel, with the projection likewise inward. It should be fastened by three nails on the outer edge, the posterior nail being about the middle of that edge. The nails should be thin, and flat-headed, so that when driven close they shall occupy a considerable portion of the ground surface of the fore part of the shoe. Both the ground and foot surfaces should be flat, and the shoes made of good iron, but thin and light. The only difference between the fore and the hind shoe is that the hind shoe is thinner and lighter, not quite so broad or so much curved, and, particularly, more pointed, and more turned up at the toe.



A. The ground-surface of the fore-shoe
B. Do. of the hind shoe.

Some farmers shoe the fore feet only, others take in the two outside claws of the hind feet; but it would be little additional trouble or expense to shoe them *all round*, and then they would be safe.

The principal objection to shoeing the ox arises from the difficulty of putting the shoes on. The beast will seldom submit quietly, and recourse must be had to the *trevis* or to casting him. The latter is dangerous and frequently accompanied by accident either to the ox or the smith. The best trevis is that recommended by Bakewell, a description and engraving of which may be found in the 'British Husbandry,' p. 221. Much of the unruliness of the beast, however, might be overcome by kind treatment, and by often handling the steer, and lifting his feet, and striking them gently with a hammer. Finding that no harm is done to him, he will permit this without fear, and he will be likely to submit to the apparently similar process of shoeing. It is fear, and not natural indocility, which causes the resistance of the beast.

CHAPTER XIX.

THE DISEASES OF THE SKIN.

The skin of the ox differs little from that of the horse, except that it is thicker, and apparently less sensible; therefore for some observations on the structure and functions of the skin, the reader is referred to the Treatise on the Horse, p. 369: they apply equally to the greater part of our domesticated animals.

The horseman properly attaches great importance to the state of the skin in that animal. If it is hard and dry, and unyielding, he says that the horse is out of condition; and then he knows full well that although the animal may have no decided disease about him, yet he is scarcely capable of discharging his ordinary duty, and altogether unequal to any extraordinary exertion. Graziers know as well that the beast whose skin is not soft, and mellow, and elastic, can never carry any profitable quantity of flesh and fat; therefore they judge of the value of the animal even more by the handling than they do by the conformation of parts.

The skin is filled with innumerable little glands which pour out an oily fluid, that softens and supplies it, so that we can easily take it between the finger and thumb, and raise it from the parts beneath; and while we are doing this, we are sensible of its peculiar mellowness and elasticity. At another time or in another animal, the skin seems to cling to the muscles beneath, and feels harsh and rough when we handle it; but the skin is not altered or diseased, it is this secretion of oily fluid that is suspended. We attach the idea of health to the mellow skin, and of disease to the harsh and immoveable one, because the experience of ourselves and of every body else has confirmed this connection, and the principle is that when one secretion is properly discharged, the others will generally be so, and when one is interrupted the harmony of the system is too much disturbed for the animal to thrive or to be in vigour.

Then, as a symptom of a diseased state of the constitution generally, the attention is first directed to

HIDE-BOUND.

The term is very expressive—the hide seems to be bound, or to cling to the muscles and bones. It does not actually do so, but it has lost its softness, and we can no longer raise it, or move it about. The secretion of the oily fluid which supplies the skin is disturbed; this argues disturbance elsewhere, and the feeling of the skin usually indicates the degree of that disturbance.

With hide-bound is connected a rough and staring coat. The surface of the skin is become hard and dry; the minute scales with which it is covered no longer yield to the hair, but separating themselves in every direction, they turn it in various ways, and so give to it that irregular and ragged appearance which is one of the characteristics of want of condition.

These two circumstances—hide-bound and a staring coat—are unerring indications of evil. A cow may be somewhat off her feed—she may hoose a little—she may have various little ailments; they should not be neglected; but while the skin is loose and the hair lies smooth the farmer has not much to fear: if, however, the coat begins to stare, and the skin to cling to the ribs, it behoves him to examine into the matter. What disease unobserved has been preying upon the constitution?—has hoose been degenerating into phthisis?—has some chronic affection of the liver been weakening the strength of the digestive organs? or what has been wrong in the management of the beast? Has she been unnecessarily and cruelly exposed to cold and wet—has she been fed on unwholesome provender, or has she been half starved?

If the thrifty appearance cannot be traced to any evident cause, still there can be no doubt that something is wrong. Hide-bound is rarely a primary disease; it is a symptom of disease, and oftener than of any other disease of the digestive organs. A dose of physic should be given (eight ounces of sulphur, with half an ounce of ginger,) and a few mashes should be allowed. After this medicines should be administered that have a tendency to rouse the vessels of the skin to their due action, as sulphur, nitre, and antimonial powder, with a small quantity of ginger. No direct tonic should be administered while the cause of this want of condition is unknown, but warm purgatives and diaphoretic medicines will often have a good effect.

MANGE.

This is the most serious among the diseases of the skin in cattle. The first symptom is a constant itchiness. The cow eagerly rubs herself against every thing that she can get at. The hair comes quite off or gets thin on various parts of the body. There are few scabs or sores; but either in consequence of the rubbing, or as an effect of the disease, a thick scurfiness appears, particularly along the back, and in patches on other places. It is first seen about the tail, and thence it spreads in every direction. The cow soon begins to lose condition, the ridge of her back becomes prominent, and her milk decreases, and sometimes is deteriorated in quality.

The causes are various; they are occasionally as opposite as it is possible for them to be. Too luxuriant food will produce it; it will more certainly follow starvation. The skin sympathizes with the over-taxed powers of digestion in the one case, and with the general debility of the frame in the other; and nothing is so certain of bringing on the worst kind of it as the sudden change from comparative starvation to luxuriant food. Want of cleanliness, although highly censurable, has been oftener accused as the cause of mange than it deserves; but to nothing can it more frequently be traced than to contagion.

The treatment is simple and effectual. The diseased cattle should be removed to some distant stable or shed where there can be no possible communication with the others. The disease, however produced, must be considered and treated as a local one. The scurfiness of the skin must first be got off, by means of a hard brush, or a curry-comb, somewhat lightly applied. To this must follow the application of an ointment which appears to have a specific effect on the mange, and which must be well rubbed in with a soft brush, or, what is far better, with the hand, morning and night: there is no danger of the disease being communicated to the person so employed. The ointment must have sulphur as its basis, aided by turpentine, which somewhat irritates the skin and disposes it to be acted upon by the sulphur; and, to render it still more efficacious, a small portion of mercury must be added. The following will be a safe, and very effectual application—there are few cases which will resist its power. 'Take of flowers of sulphur a pound, common turpentine four ounces, strong mercurial ointment two ounces, and linseed oil a pint. Warm the oil and melt the turpentine in it; when they begin to get cool add the sulphur, and stir the ingredients well together, and afterwards incorporate the blue ointment with the mass by rubbing them together on a marble slab.'

Vast numbers of cattle have been lost by the use of stronger and poisonous applications. Corrosive sublimate, in the form of an almost saturated solution of it, is a favourite lotion with many practitioners.* Arsenic—hellebore—tobacco† have had their advocates, and have murdered thousands of cattle.

The practitioner must not, however, confine himself to mere local treatment, physic should always be administered. Sulphur, in doses of eight ounces every third day, will materially assist in effecting a cure; and on the intermediate days nothing better can be given than the powder recommended for hide-bound (p. 571.) Mashes also should be allowed every night.

LEPROSY.

Mange neglected or improperly treated may degenerate into a worse disease, but fortunately not one of frequent occurrence. The scurf will be succeeded by scabs—there have been cases in which the scabs have appeared from the beginning—and the skin becomes thickened and corrugated, and covered with scales, and occasionally the scales peel off, and corroding ulcers appear beneath.

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* The author of this Treatise attended five cows belonging to a gentleman that were afflicted with bad mange. He applied the ointment and the powders here recommended, and the case was going on slowly but satisfactorily. He did not wish to make too much haste in the business, for the disease had been of considerable standing, and the animals had been much reduced by it. He was afraid of a worse evil if he repelled this confirmed and general cutaneous eruption too quickly. The gentleman, however, was impatient; the cowherd was more so, and the case was put under the hands of a farrier. He brought a great bottle of some lotion; he applied it freely about them; he used almost the whole of it. In a little more that twelve hours one of them began to foam at the mouth—she staggered, fell, and died. In less than twenty-four hours they were all dead. The first practitioner was sent for in great haste, and arrived just in time to witness the death of the last cow. He secured the bottle: it contained a strong solution of corrosive sublimate mixed with some unknown vegetable decoction.

† A friend of the Editor was requested to see four cows that had been dressed for mange. One of them was dead when he arrrived; another died afterwards; the other two recovered, and were found to be cured of the mange. Another friend who sometimes uses a decoction of tobacco, says that he is sometimes thoroughly frightened by it—that the animal breaks out into profuse perspiration, and falls and rolls, and there is great prostration of strength: and that nothing should induce him to have recourse to this mode of treatment, except in his own stables, and under his immediate inspection.

The same ointment but with double the quantity of mercury, must be used for this aggravated state of the disease, and a stronger alterative powder, consisting of two drachms of Ethiop's Mineral, added to the one already recommended. All this mercury, however, must be used with caution, for it is not a drug that always agrees with the ruminant; and salivation would, temporarily at least, and in most cases permanently, injure the beast, both for the dairy and the pasture.

In those sadly aggravated cases that come under the observation of the practitioner, in which the whole of the skin is thickened and corrugated, with deep chaps running down on either side, or uniting together in various directions—when within the substance of the skin numerous tubercles can be felt, varying from the size of a millet-seed to that of a kidney-bean—when the eye-lids are swelled so that the animal can scarcely see, and a great quantity of mucus is discharged from them—when the nostrils and lips are thickened, and dense and yellow mucus runs from the nose—when, beginning from the knees, and reaching almost to the hoofs, the intervals between the chaps are occupied by tuberculous grapes, of different sizes, and some of which discharge a serous fluid;—in such cases the surgeon may well be puzzled what to do.

The animal must be bled and physicked; but his strength must be supported by mashes and plenty of fresh green meat: he must be fomented all over many times every day, and he must be kept where he cannot communicate the infection. If the inflammation does not begin to subside, he must be bled again and again; the physic must be repeated; sulphur will constitute the best physic here, and he must be kept under its purgative influence: and, at length, the skin beginning to supple—the cutaneous inflammation having, to a considerable degree subsided—the ointment and the powder recommended for mange must be used. Should they not have sufficient effect, recourse must be had to the stronger ones prescribed for leprosy. Previous, however, to the use of either of the ointments, and after the inflammation has abated, the solution of the chloride of lime may be applied on two or three successive days with much advantage.*

LICE.

Connected with mange, the usual accompaniment, and probably the occasional cause of it, is the appearance of vermin on the skin. It cannot be supposed that they are originally produced by any disease or state of the skin; but the ova (eggs) of these animalculæ, floating in the atmosphere, find in the skin of cattle, under certain circumstances, and under those alone, a proper nidus, or place where they may be hatched into life. A beast in good health and condition will not have one of those insects upon him unless he mixes with lousy cattle; but if he is turned out in the straw-yard in winter, and is half-starved there, and his coat becomes rough, and matted, and foul, they will soon swarm upon him. By the constant irritation which they excite, they will predispose the skin to an attack of mange from other causes, if they do not actually produce it.

He who had not personal observation of the fact, would hardly believe how numerous they soon become. There are myriads of them on the hide of the ill-fated beast. They keep him in a constant state of torment, and are, in a manner, devouring him before his time. It cannot be surprising that they rapidly spread from one animal to another. The slightest contact, the lying on the same lair, or the feeding on the same pasture, is sufficient to enable them to be communicated from the infected beast to all the rest. The animalcule thrives every where, although the ovum did not find a proper nidus on the skin of the healthy beast; and the vermin, once established there, soon change the character of the skin, and cover it with scurf and mange.

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* For illustrations of this form of the disease, the reader is referred to a Memoir, by M. Santin, on Elephantiasis in cattle, and also to the Journal Pratique for 1829, p. 421, and for 1831, p. 10. A useful paper will also be found in the Réc. de Méd. Vét., 1830, p, 42.

Various powders and lotions have been recommended for the destruction of these parasites. A powder can scarcely be brought into contact with a thousandth part of them; nor can a lotion, unless used in a quantity sufficient to kill the beast as well as those that are feeding upon him. An ointment is the most convenient application, and by dint of rubbing, a little of it may be made to go a great way. The common scab ointment for sheep (one part of strong mercurial ointment and five of lard) will be effectual for this purpose; and if a little of it is well rubbed in, instead of a great deal being smeared over the animal, there will be no danger of salivation.

WARBLES.

Towards the latter part of the summer and the beginning of autumn, and especially in fine and warm weather, cattle out at pasture are frequently annoyed by a fly of the Diptera order and the Œstrus genus, that seems to sting them with great severity. The animal attacked runs bellowing from his companions, with his head and neck stretched out, and his tail extending straight from his body, and he seeks for refuge, if possible, in some pool or stream of water. (The fly seems to fear, or to have an aversion to the water, and cattle are there exempt from its attack.) The whole herd, having previously been exposed to the same annoyance, are frightened, and scamper about in every direction, or, one and all, rush into the stream. Under the excitation of the moment, they disregard all control, and even oxen at work in the fields will sometimes betake themselves to flight with the plough at their heels, regardless of their driver or of the incumbrance which they drag behind them.

The formidable enemy that causes this alarm, and seems to inflict so much torture, is the *Œstrus Bovis*, the Breeze or Gad-fly, which at this time is seeking a habitation for its future young, and selects the hides of cattle for this purpose. It is said to choose the younger beasts, and those that are in highest condition. There has evidently been considerable exercise of selection, for a great many of the cattle in the same pastures will have only a few warbles on their backs, while others will, in a manner, be covered by them.

Naturalists and agriculturists are indebted to Mr. Bracy Clark for a very accurate account of this fly; and the author acknowledges his obligations to this celebrated veterinarian, and more particularly to that excellent French entomologist, M. Reaumur, for much of that which he is enabled to offer respecting the history of this insect.

The *œstrus bovis* is the largest and most beautiful of this genus. Its head is white, and covered with soft down—its thorax yellow anteriorly, with four black longitudinal lines—the centre of the thorax is black, and the posterior part of an ashen colour—the abdomen is also of an ashen colour, with a white black band in the centre, and covered posteriorly with yellow hair. It does not leave its chrysalis state until late in the summer, and is then eagerly employed in providing a habitation for its future progeny. It selects the back of the ox, at no great distance from the spine on either side, and alighting there it speedily pierces the integument, deposits an egg in the cellular substance beneath it, and probably a small quantity of some acid, which speedily produces a little tumour on the part, and accounts for the apparent suffering of the animal.*

The egg seems to be hatched before the wound is closed, and the larva or maggot, occupies a small cyst or cell beneath it. The tail of the larva projects into this opening, and the insect is thus supplied with air, the principal air-vessels being placed posteriorly; while with the mouth, deep at the bottom of the abscess, it receives the pus, or other matter that is secreted there. A fluid, resembling pus, can always be squeezed from the tumour, and increasing in quantity as the animal approaches his change of form. In its early stage of existence the larva is white like that of most other flies; but as it approaches its maturity, it becomes darker, and at length almost black. These little tumours form the residence of the larva, and are recognised by the name of *warbles.*

The abscess having been once formed, appears to be of little or no inconvenience to the beast on whose back it is found. It certainly does not interfere with his condition,† and the butcher regards the existence of these warbles even as a proof of a disposition to thrive. The injury to the skin, however, is another affair, and the tanner would probably tell a different story. The larva, if undisturbed, continues in his cyst, until the month of June or July in the following year, and then forces itself through the aperture already described, and the accomplishment of which occupies two days. It is soft when it first escapes, but it soon hardens; and if it is fortunate enough to escape the birds which are on the look-out for it, or if it does not fall into the water, which the cattle seem now instinctively to seek, as it were to destroy as many of their enemies as possible, it conceals itself in the nearest hiding-place it can find, where it remains motionless until it changes to a chrysalis, which is speedily effected; it continues in its new form about six weeks, and then bursts from its shell a perfect fly.

It is a very singular circumstance, that the escape of the larva from its prison on the back of the ox always takes place in the morning, and between six and eight o'clock. Is the mysterious principle of instinct already at work? Does the maggot know, that if it forced itself through the hole in the warble at a later period, the heat of the sun would destroy it; or that if it fell during the night, it would perish before it could reach a place of refuge?

Being also exposed to many dangers in its chrysaline state, it is then covered with a scaly box of great strength, and from which it would seem impossible for it ever to make its escape; but when its change is complete, and it begins to struggle within its prison, a valve at one end of its narrow house, and fastened only by a slight filament, flies open, and the insect wings its way, first to find its mate, and then to deposit its eggs on the cattle in the nearest pastures.

Some farmers are very careless about the existence of these warbles; others very properly endeavour to destroy the grub that inhabits them.

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* The weapon by means of which the perforation is effected is a very singular one. It seems to be formed of three different pieces, inclosed the one within another, like the divisions of a telescope, and from the farthest and smallest the true auger, or perforator, proceeds.

† In 1823 and 1824, however, the œstri were so numerous in the department of Loiret, in France, and the tumours accumulated to that extent on the cattle, that they occasioned fever, inflammation, and death. There was a disposition to inflammatory fever prevailing at the same time amongst most species of domesticated animals.—Rapport à la Société Royale et Centrale d'Agriculture, 1826.

This is effected in various ways—a little corrosive liquor is poured into the hole, or a red-hot needle introduced, or the larva is crushed or forced out by pressure with the finger and thumb. Although the existence of the warble is a kind of proof of the health and condition of the animal, yet there is no reason why the best beasts should be tormented by the gad-fly, or the strongest and best hides be perforated, and, in a manner, spoiled in their best parts. Although when the larva escapes or is expelled, the tumour soon subsides, the holes made are scarcely filled up during that season; and even a twelvemonth afterwards, a weakness of the hide, and disposition to crack, will show where the bot has been. If all the farmers could be induced to search for and destroy the insect when a larva, the cattle of that district might be nearly or quite freed from this pest.

ANGLE-BERRIES, OR WARTS.

Cattle are subject to various excrescences growing from the cuticle at first, but afterwards identified with the true skin. They assume many forms, from that of scales of greater or less thickness, and accompanied sometimes by chaps and sores, to fungous growth, of different size and hardness, and bearing the character of warts. They are occasionally very numerous and exceedingly troublesome; and they are most numerous and exceedingly troublesome about the teats. When they grow about the eyelids they are a sad nuisance to the beast.

When they are only exfoliations and scales of the cuticle, friction with camphorated oil will occasionally remove them. It has been known to disperse the warty excrescences. Mercurial preparations, whether blue ointment, or corrosive sublimate and soap, are dangerous, but they will usually get rid of the angle-berries. When they are numerous, and particularly about the udder, the practitioner will probably try to remove the largest of them by means of a ligature passed round their roots. This, however, will often be an almost endless affair, and recourse must be had to the knife and the cautery. The cautery will stop the bleeding, destroy the root of the wart, and thus prevent its springing again. When they are small, this will be most successfully attacked by means of the nitrate of silver, the warts being touched daily with it in a solid form, if they are few and distinct; or washed with a strong solution of it, if they are more numerous and scattered over a large surface. They have been attributed to various causes, as contusions, stings of insects, want of condition, inflammation of the skin; but in most cases the actual cause is unknown.

A singular case of the periodical appearance of warts occurred in the author's practice. At uncertain intervals, from six to nine, or ten months, a cow suddenly lost flesh, her coat stared, she would scarcely eat, and at length, rumination was entirely suspended; then would appear, and nearly all over her, and particularly about the udder and in the mouth, and on the eyelids, a thick crop of warts, varying from the size of a millet-seed to twice that bulk. She was well physicked, and mashes were given to her—she recovered her appetite and spirits, the warts began to diminish, and in a fortnight they were gone.

Mr. Starks of Westwoodside, Lanark, relates a somewhat similar case. He had a cow mostly of a white colour with some black spots. She became ill from being over heated as Mr. Starks supposed—her appetite failed—she yielded no milk—she became exceedingly weak, and her eyes sunk in their sockets—the pulse was sixty—the skin warm—the extremities cold. She soon became hide-bound, and her skin was strangely hard

She was bled and purged, and sulphur was given daily as an alterative, and she was well rubbed with oil in order to soften the skin. In a little while the cuticle, or outer layer of the skin, began to separate from the cutis or true skin beneath; the hair separated along with it, until from the mouth to the tail, and half-way down the legs, there was not a particle of hair remaining, except where there had been a spot of black, and on that place it continued quite soft and healthy. From the moment of the falling of the hair, the cow began to get better, and speedily recovered her appetite, and yielded her usual quantity of milk; the hair, likewise, was by degrees reproduced on every part but the shoulders.*

CHAPTER XX.

A LIST OF THE MEDICINES USED IN THE TREATMENT OF THE DISEASES OF CATTLE.

In the present imperfect state of the knowledge of the diseases of cattle and their remedial treatment, it may be supposed that many gross errors are committed—many inert or injurious medicines administered—many complaints aggravated, and thousands of animals lost. The pharmacopœia of the cow-leech does not indeed contain a numerous list of drugs, but a considerable proportion of them are either useless or dangerous, or administered in ineffectual or destructive doses. It is not, however, the object of the editor of this work to draw up a catalogue of errors and abuses in cattle-practice, although he might easily present one, ridiculous and disgusting to an almost inconceivable degree; but to describe the properties, and doses, and combinations of those medicines which the experience of rational practitioners in former times, and the inquiries of scientific men in these later years of veterinary improvement, have sanctioned.

Alcohol.—There are two circumstances which not only render the practice of giving stimulants to cattle far more excusable than in the horse, but absolutely necessary: the first is the disposition which all the inflammatory diseases of cattle have to take on a typhoid form, and assume a malignant character—and the second is, the construction of the stomachs of these animals, in consequence of which a considerable portion of the medicine falls into the comparatively insensible paunch. Hence, inflammation having been subdued, the practitioner is always anxious to support the strength of the constitution; and even while he is combating inflammation he cautiously adds a stimulant to the purgative, in order that he may dispose the tissues with which that purgative may come into contact to be affected by it. Hence ginger forms an indispensable ingredient in every aperient drink; hence the recourse to wine in many cases of low fever; and hence also the foundation of, and the excuse for, the custom of adding the sound home-brewed ale to almost every purgative, and especially for young and weakly cattle, when evident inflammatory action does not forbid it. The fiery spices and the almost undiluted spirit administered by the cow-leech can never be justified; yet, in cattle-practice, the beneficial effect of the aperient often depends fully as much on the carminative by which it is accompanied, as on the purgative power of the drug itself.

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* Veterinarian, April, 1834, p. 97.

Aloes.—This is the best, and almost the only purgative on which dependence can be placed in the treatment of the horse; but it holds a secondary rank, or might be almost dismissed from the list of cattle-aperients. It is always uncertain in its effect, and sometimes appears to be absolutely inert. Six ounces have been given without producing any appreciable effect; and, in another case, a similar dose was given, which was followed by considerable irritation and fever, but it did not purge. The animal was destroyed on the following day, in order to ascertain how far this apparent inertness might be attributed to that state of the œsophagean canal in which the greater part of the medicines administered enters the rumen, and being detained there cannot possibly produce its destined effect. A very small quantity of the drug was found in that stomach. Still, however, as there is no case on record in which it has destroyed the ox by superpurgation, as it too often has the horse, and as occasionally it does seem to exert some purgative effect, it may be admitted in combination with, or alternating with other purgatives when constipation is obstinate: few, however, would think of resorting to it in the first instance.

The Barbadoes Aloes should be selected, for the horse; and on account of the construction of the stomachs of ruminants, it must be always administered in solution, for a ball would break through the floor of the œsophagean canal and be lost in the rumen. Two ounces of aloes, and one ounce of gum-arabic (in order to suspend the imperfectly dissolved portion of the aloes) should be put into a pint of boiling water, and the mixture frequently stirred during the first day; then two ounces of tincture of ginger are to be added, not only to prevent the mixture from fermenting, but because that aromatic seems to be so useful, and in a manner indispensable in cattle purgatives. The dose should consist of from half a pint to a pint of the solution, or from four to seven or eight drachms of the aloes. Some persons boil the aloes in the water, but the purgative effect of the drug is much lessened by this.

Aloes are very useful in the form of tincture. Eight ounces of powdered aloes and one ounce of powdered myrrh should be put into two quarts of rectified spirit, diluted with an equal quantity of water. The mixture should be daily well shaken for a fortnight, when it will be fit for use. It is one of the best applications for recent wounds; and in old wounds especially, accompanied by any foulness of them, or discharge of fœtid pus, nothing will be more serviceable than equal parts of this tincture and a solution of the chloride of lime.

Alteratives.—These are medicines that are supposed to have a slow yet beneficial effect in altering some diseased action of the vessels of the skin or of the organs of circulation or digestion. To a cow with yellows, or mange, or that cannot be made to acquire condition, or where the milk is diminishing, small quantities of medicine are often administered under the tempting, but deceptive, term of *alteratives*. They had much better be let alone in the majority of cases. If a cow is really ill, let her be treated accordingly; let her be bled or physicked, or both; but let her not be nauseated, or her constitution ruined, by continually dosing her with various drugs. The want of condition and thriving in cattle is far more connected with a diseased state of their complicated stomachs, and particularly with obstruction in the manyplus, than with any other cause; the alteratives, then, should be small quantities of purgatives, with aromatics, as Epsom salt, or sulphur with ginger; or, what would be still preferable, rock salt in the manger for them to lick, or common salt mingled with their food. There can, however, be no doubt that in many cutaneous affections, and especially where mange is suspected, alterative medicines will be very beneficial. They should be composed of Æthiop's mineral, nitre, and sulphur, in the proportions of one, two, and four, and in daily doses of from half an ounce to an ounce.

Alum.—This is a useful astringent in diarrhœa, and especially in the purging of calves. It is best administered in the form of alum whey, which is composed of two drachms of powdered alum, dissolved in a pint of hot milk; a drachm of ginger may be added; and, if the purging is violent, a scruple of opium. Alum is rarely used externally in the treatment of cattle, unless for canker in the mouth, and as a useful wash after the tongue has been lanced in blain; and unless in the form just mentioned, the less it is used internally the better.

Ammonia is not frequently used. In the form of hartshorn it enters into the composition of some stimulating liniments, as in cases of palsy. The carbonate of ammonia has been extolled as a specific for hoove. The author always doubted this; he put it to the test, and it failed. It was administered as a chemical principle, it being supposed that the alkali would neutralize the acid gas that was extricated from the fermenting food; but it has been proved that this gas consists chiefly either of carburetted or sulphuretted hydrogen: besides which there is another consideration, that, except administered by means of Reed's pump, not one drop of the ammonia would find its way into the paunch.

Anodynes.—The only one used in cattle-practice is opium. The doses in which it may be employed have already been pointed out when treating of the diseases in which it is indicated.

Antimony.—There are but three preparations of it that can be useful to the practitioner on cattle. The first is

Emetic Tartar, which, in doses from half a drachm to a drachm, and combined with nitre and digitalis, has great efficacy in lowering the circulation of the blood in inflammation of the lungs and every catarrhal affection, and particularly in that species of pleurisy to which cattle are so subject. Emetic tartar, rubbed down with lard, constitutes a powerful and very useful stimulant when applied to the skin.

Antimonial Powder—the powder of oxide of antimony with phosphate of lime. It is frequently sold in the shops under the name of James's Powder, and possesses all the properties of that more expensive drug. It is a useful febrifuge in cases where it may not be advisable to nauseate the beast to too great a degree.

Chloride (Butyr) of Antimony.—Where it is wished that a caustic shall act only superficially, this is the most useful one that can be employed. It has a strong affinity for water, and therefore readily combines with the fluids belonging to the part to which it is applied, and so becomes diluted and comparatively powerless, and incapable of producing any deep and corroding mischief. It has also the advantage, that, by the change of colour which it produces, it accurately marks the extent of its action, and therefore forms an unerring guide to the surgeon. For warts, foul in the foot, cankered foot, and for some indolent and unhealthy wounds, it is a valuable caustic and stimulant.

Antispasmodics.—Opium, for its general power, and particularly for its efficacy in locked jaw, stands unrivalled. The spirits of turpentine and nitrous ether are useful in cases of colic.

Astringents.—These are few in number, but they are powerful: alum, catechu, opium (an astringent because it is an anodyne) and blue vitriol comprise the list: the first used both externally and internally; the two next internally; and the last internally, but chiefly powerful as arresting nasal discharge.

Blisters.—The thickness of the skin of cattle renders it somewhat difficult to produce any great degree of vesication. The part should be previously fomented with hot-water, then thoroughly dried, and the blistering application well rubbed in. With these precautions the common blister ointment will act very fairly; the turpentine tincture of cantharides still better; while an ointment composed by triturating one drachm of emetic tartar with six of lard will produce more powerful and deeper irritation, but not so much actual blistering. Sometimes boiling water, and in a few cases, and especially in bony enlargements about the legs attended by much lameness, the hot iron will be resorted to.

Calamine.—See Zinc.

Calombo.—A very useful tonic, and especially in those cases of debility which accompany or follow dysentery. It should be given in doses of from one to three drachms, combined with ginger.

Calomel.—See Mercury.

Camphor.—Used externally alone in cattle-practice. It is a component part in the liniments for palsy and garget.

Cantharides—the principal ingredient in all blistering ointments, and to which they owe their power. Corrosive sublimate, sulphuric acid, and euphorbium, may increase the torture of the animal, but they will generally blemish, and often lay the foundation for deep and corroding ulcers. The best blister ointment for cattle is composed of one part of cantharides (Spanish flies) finely powdered, three of lard, and one of yellow resin; the lard and the resin should be melted together, and the flies added when these ingredients begin to cool.

Carraways.—The powder of these seeds may be used as an occasional change for ginger; yet it is not so stomachic as the ginger, and is decidedly inferior to it, except in cases of flatulent colic. It may be given in doses, from half an ounce to two ounces.

Castor Oil.—An effectual and safe purgative for cattle in doses from twelve ounces to a pint, and that will be properly employed when Epsom salt or other aperient drugs have not produced their desired effect. It is usually made into a kind of emulsion with the yolk of an egg. It is however to be doubted whether it is much superior to a less expensive purgative, the linseed-oil.

Catechu is an extract from the wood of one of the acacia trees. It is much less expensive than the Gum Kino, and it is, when unadulterated, more effectual than that gum in subduing the diarrhœa of calves or adult cattle. The quantity, and the drugs with which it should be combined, have been stated in p. 476.

Caustics.—In the treatment of foul in the foot, these are indispensable, and the chloride (butyr) of antimony has no rival in the certainty with which it destroys the fungus or otherwise unhealthy surface to which it is applied, and the equal certainty of its destructive power being confined to the surface. For warts, angle-berries, &c., externally situated, the nitrate of silver in substance, or in the form of a strong solution, will be most effectual; for canker in the mouth, barbs, and paps, a strong solution of alum will be as useful as any thing; and in order to stimulate indolent and unhealthy ulcers, nothing can compare with the diluted nitric acid.

Chalk.—See Lime.

Chamomile.—If it were necessary to add another tonic to the gentian and calombo it would be the chamomile, and on the principle of not being so powerful as either of the others, and therefore used in somewhat doubtful cases, when, if the state of fever has not quite passed over a stronger stimulant might have been prejudicial.

Charges.—These are thick adhesive plasters spread over parts that have been strained or weakened, or that are affected with rheumatism, and which, being applied warm, mingle so with the hair, that they cannot be separated for a long time afterwards. They give a permanent support to the part, and likewise exert a gentle but constant stimulating power. Old cows, weakened and rendered almost useless by a rheumatic affection of the loins, which is degenerating into palsy, often derive much benefit from the application of a charge. It is also useful when the joints are the seat of rheumatic lameness.

Clysters.—The importance of the administration of injections has not yet been sufficiently acknowledged in cattle practice. A recurrence to the account which has been given of the lower or larger intestines of cattle, and which, although long, are not capacious compared with those of the horse, and whose surface is not irregular and cellated as in that animal, but perfectly smooth, so that a fluid will readily pass along them and to their full extent, will show the propriety of having frequent recourse to this mode of administering medicine. A soothing and emollient injection may be brought into contact with the inflamed and irritable surface of these intestines; or, on the other hand, that surface may be extensively and beneficially stimulated by the direct application of purgative medicine. The former is a most important consideration in diarrhœa and dysentery; and the latter is not of less moment when the comparative insensibility of the three first stomachs of cattle is regarded. Much may be done by means of the bladder and pipe, but the newly-invented stomach and enema-pump of Read enables the practitioner to derive from injections all the advantages that can be connected with their administration.

Copper.—There are but two compounds of this metal that have any value in cattle-practice, and they are the Blue Vitriol, or sulphate of copper, and Verdigris, or acetate of copper. The use of the first is limited to the coryza, or inflammation of and defluxion from the nose in cattle, accompanied by little or no cough or fever, and which is sometimes in a manner epidemic. The manner of administering it is described in p. 313. As a caustic the blue vitriol is altogether superseded by those mentioned under that head.

Verdigris is employed externally only, in one of the varieties of foul in the foot, in order to repress fungous growths. It is mixed with an equal portion of the sugar of lead, reduced to a fine powder, and sprinkled on the diseased surface.

Cordials.—These are destructively abused by many cow-leeches, but, as has been again and again stated, there is that in the structure and constitution of cattle, which will excuse their administration much oftener than in the horse. Except in extreme cases, and when their use is sanctioned by the decision of a competent veterinary practitioner, they should not extend beyond good home-brewed ale, and ginger and carraways; or, perhaps, because the farmer will seldom believe that a drink for a cow can be good for anything unless it stinks of aniseed, a few drops of the oil of those seeds may be allowed. The bay berries, and cardamom seeds, and coriander seeds, and cumin seeds, and diapente, and elecampane, and fennel seeds, and fenugreek seeds, and grains of paradise, and juniper berries, and horse-spice, and pepper, and various other pungent aromatics that encumber the shelves and loads the drinks of him of the old school, should be banished from the pharmacopœia of the rational practitioner of cattle-medicine.

Corrosive Sublimate.—See Mercury.

Croton Seeds.—These can scarcely be admitted into practice on ordinary occasions, or as a usual purgative; but in cases of phrenitis, tetanus, inflammatory fever, and in those strange constipations which so often puzzle and annoy, the croton seed, in doses of from ten to sixteen grains, may be allowed. The bowels having been opened, the practitioner will keep up the purgative action by means of a milder and safer aperient. The seeds should be kept in a close bottle, and when wanted, should be deprived of their shells, and pounded for use. The farina soon loses its power, and the oil is shamefully adulterated.

Diaphoretics.—The thick hide of the ox forbids us to expect much advantage from those drugs which are supposed to have their principal influence determined to the skin, and thus to increase the sensible and insensible perspiration; yet emetic tartar and sulphur are, to a considerable extent, valuable in cases of fever—and the latter most certainly in cutaneous eruption and mange, by opening the pores of the skin, or exciting its vessels to healthy action. One, however, of the best diaphoretics is that which has been comparatively lately introduced in the general management of cattle, viz., friction applied to the skin. It needs but the slightest observation to be convinced that the health of the stall-fed beast, and his thriving and getting into condition, are materially promoted by the liberal use of the brush, and sometimes even of the curry-comb.

Digitalis (Foxglove.)—The leaves of this plant, gathered about the flowering season, dried, kept in the dark, and powdered when wanted, are most valuable in diminishing the frequency of the pulse, and the general irritability of the system in cattle. A reference to the treatment of almost every febrile disease will illustrate this. The dose is from half a drachm to a drachm, with emetic tartar, nitre and sulphur, and administered twice or thrice in the day, according to the urgency of the case. The practitioner must not be alarmed at the intermittent pulse which is produced. It is by means of certain pauses and intermissions in the action of the heart, that the rapidity of the circulation is diminished when this drug is exhibited. The intermittent pulse is that which the practitioner will be anxious to obtain, and which he will generally regard as the harbinger of returning health.

Diuretics.—These fortunately are not so much used in cattle-practice as in that of the horse; they are, however, allowable and beneficial in swelled legs, foul in the foot, and all dropsical affections, while they advantageously alternate with other medicines in the treatment of mange, and all cutaneous affections, and in cases of mild or chronic fever. Nitre and liquid turpentine are the best diuretics; and almost the only ones on which dependence can be placed. The doses have been already pointed out.

Drinks.—It is needless again to explain the reason why all medicines that cannot be concealed in the food must be administered to cattle in the form of drinks. If they are exhibited in a solid form, they will break through the floor of the œsophagean canal, and enter the rumen. Farriers and cow-leeches, however, often give to their drinks the force and momentum of a ball, by the large vessels from which they are poured all at once down the throat. There are few things of more consequence than attention to the manner in which a drink is administered.

Elder.—The leaf of this tree is used boiled in lard. It forms one of the most soothing and suppling ointments that can be applied. The practitioner should make his own elder ointment, for he will often receive from the druggist an irritating unguent formed of lard coloured with verdigris, instead of the emollient one furnished by the elder.

Epsom Salt.—See Magnesia.

Fomentations.—If, owing to the greater thickness of the skin, these are not quite so effectual in cattle as in the horse, yet, as opening the pores of the skin and promoting perspiration in the part, and thus abating local swellings, and relieving pain, and lessening inflammation, they are often exceedingly serviceable. The practitioner may use the decoction of what herbs he pleases, but the chief virtue of the fomentation depends on the warmth of the water.

Gentian.—An excellent stomachic and tonic, whether at the close of illness, or as a remedy for chronic debility. Its dose varies from one to four drachms, and should be almost invariably combined with ginger.

Ginger.—The very best aromatic in the list of cordials for cattle, and with the exception of carraways, superseding all the rest. The dose will vary from half a drachm to four drachms.

Goulard's Extract.—See **Lead.**

Hellebore, Black.—The root of it forms an excellent seton when passed through the dew-lap; it produces plenty of swelling and discharge, and rarely or never runs on to gangrene.

Iodine.—The use of this mineral is limited to a few cases, but there its effect is truly admirable. It will scarcely ever fail of dispersing enlargements of the glands, or hardened tumours, whether under or at the side of the jaw, or round the joints. One part of hydriodate of potash must be triturated with seven parts of lard, and the ointment daily and well rubbed on and round the part. Indurations of the udder seldom resist its power, unless the ulcerative process has already commenced.

There is a still more important use to which this drug may be applied. It possesses some power to arrest the growth of tubercles in the lungs, and even to disperse them when recently formed. It is only since the former part of this work was written that the attention of the author has been so strongly directed to this property of iodine, and that he has had such extensive opportunities of putting it to the test. He will not say that he has discovered a specific for phthisis or consumption in cattle, but he has saved some that would otherwise have perished, and, for a while, prolonged the existence and somewhat restored the condition of more. He would urge the proprietor of cattle, and more especially his fellow-practitioners, to study closely the symptoms of phthisis, as detailed in page 410; to make themselves masters of the inward, feeble, painful, hoarse, gurgling cough of consumption; and as soon as they are assured that this termination, or consequence of catarrh, or pneumonia, or pleurisy, begins to have existence—that tubercles have been formed, and, perhaps, have begun to suppurate, let them have recourse to the iodine, in the form of the hydriodate of potash, given in a small mash in doses of three grains morning and evening at the commencement of the treatment, and gradually increased to six or eight grains. To this should be added proper attention to comfort; yet not too much nursing; and free access to succulent, but not stimulating, food; and the medicine should be continued not only until the general condition of the beast begins to improve, but until the character of the cough has been essentially changed.

Ipecacuanha.—This drug is used in the composition of the Dover's, or compound ipecacuanha powder, which has been recommended by some practitioners in the treatment of dysentery. It is thus made—'Take ipecacuanha root powdered, and opium also in powder, of each a drachm, and sulphate of potash an ounce. Rub them together to a fine powder.' The dose is from two to four drachms. This, however, is not an efficient medicine for such a disease.

Lard.—This is the principal basis of all ointments.

LAUDANUM.—See OPIUM.

LEAD, SUGAR OF—(SUPERACETATE OF LEAD.)—This, mixed with the subacetate of copper (verdigris, which see,) forms a useful caustic for the destruction of fungous growths.

GOULARD'S EXTRACT—(LIQUOR PLUMBI SUPERACETATIS.)—When the skin is unbroken, this preparation of lead is completely thrown away, whether used either as a lotion to subdue inflammation, or to disperse tumours or effusions. It is principally serviceable, applied in a very dilute form, to abate inflammation of the eye.

WHITE LEAD (SUBCARBONAS PLUMBI) is the basis of a cooling, drying ointment, used chiefly for excoriations, or superficial wounds.

LIME. CARBONATE OF LIME, CHALK.—This is a useful ingredient in all the drinks given in diarrhœa or dysentery. In every stage of these diseases there is a tendency in the fourth stomach, and perhaps in the intestines, to generate a considerable quantity of acid, than which a greater source of irritation can scarcely be imagined. The chalk, or the alkali of the chalk, will unite with this acid, and neutralize it, and render it harmless. In the diarrhœa of the calf it is absolutely indispensable, for there the acid principle is frequently developed to a great degree. The dose will vary from a drachm to an ounce.

CHLORIDE OF LIME.—The list of medicines for cattle does not contain any thing more valuable than this. As a disinfectant—if the walls, the floor, and the furniture of the cow-house or stable, are twice or thrice well washed with it, the sound cattle may return to the building with perfect safety, however contagious may have been the disease of those that had previously perished there. Applied to the pudenda of the cow that has aborted, it destroys that peculiar smell which causes abortion in others, more readily than any preparation of the most powerful or nauseous ingredient. In blain, garget, foul in the foot, and sloughing ulcers of every description, it removes the fœtor; and, if the process of decomposition has not proceeded too far, gives a healthy surface to the ulcers which nothing else could bring about—and, administered internally in blain, in the malignant epidemic, and in diarrhœa and dysentery, it is of essential service. In the last disease it is particularly beneficial in changing the nature of the intestinal discharge, and depriving it of its putridity and infection, and disposing the surface of the intestine to take on a more healthy character. Half an ounce of the powder, dissolved in a gallon of water, will give a solution of sufficient strength, both as a disinfectant applied to the cow-house, and for external and internal use as it regards the animal.

LINSEED.—Nothing can compare with the linseed meal as an emollient poultice—if the ulcer is foul, a little of the chloride of lime should be mixed with it. If the object of the poultice is to bring an ulcer into a proper state of suppuration, a little common turpentine may be added; but the cruelly-torturing caustics of the cow-leech and the farrier should never disgrace the regular practitioner.

An excellent mash in cases of catarrh or sore-throat, and as an emollient in any intestinal affection, is made by adding bran to an infusion of linseed.

LINSEED OIL.—This is little inferior to castor-oil as a purgative; it is much cheaper, and it is equally safe. Where the case seems to indicate an oily purgative, and the first dose of castor-oil fails, it may be followed up by smaller doses of linseed oil, until the desired effect is produced.

MAGNESIA, SULPHATE OF. EPSOM SALT.—This may be regarded as the staple purgative of cattle. It is as safe as Glauber's salt; it is more certain, and it will dissolve in one-third of the quantity of water. The first dose of physic should always consist of the Epsom salt, quickened in its action, in extreme cases, by the farina of the croton-nut; the purgative effect may be kept up by means of sulphur or Epsom salt, in doses of six ounces of the former, or eight of the latter, as the state of the animal may appear to require. The medium dose is about a pound, with a quarter of an ounce of ginger, but a pound and a half may be given to a large beast without the slightest danger.

MASHES are very useful in cattle-practice, not so much to prepare for physic, or to get into condition, as to form a soothing and cooling substitute, when the case requires a temporary abstinence from dry and stimulating food. They may be composed, like those of the horse, of bran only, with hot or cold water; or of bran with a decoction of linseed. In cases of debility, steeped or ground oats may be mixed with the bran, or malt may be used as a substitute for the bran and oats.

MERCURY. MERCURIAL OINTMENT.—The practitioner should be very cautious in his use of this on cattle. Indeed, it is scarcely allowable except in a very diluted state, and with the common sulphur ointment, in bad cases of mange; or a small quantity of it may be mixed with lard for the destruction of vermin.

SULPHATE OF MERCURY, ÆTHIOP'S MINERAL.—A very useful alterative combined with sulphur and nitre, where there is any cutaneous affection. The circumstances under which it may be administered, and the doses, will be found in various parts of this work.

PROTO-CHLORIDE of MERCURY. CALOMEL.—This should rarely be given to cattle, and never as a purgative. In chronic inflammation of the liver, it often has a decidedly injurious effect: in jaundice, caused by a gall-stone obstructing the biliary ducts, or in that of a more chronic nature accompanied by debility and declining condition, the experience of the writer will not warrant him in recommending the administration of calomel: he would, on the contrary, be disposed to confine its use to dysentery, in which, combined with and guarded by opium, irritation is allayed, while the natural action of the bowels is promoted.

BICHLORIDE OF MERCURY. CORROSIVE SUBLIMATE.—This drug may almost be dispensed with by the practitioner on cattle. It can never be administered internally; it is highly dangerous used externally in considerable or efficient quantity for the cure of mange or any cutaneous eruption, and as a caustic there are many as good.

MINT.—An infusion or decoction of this plant will be a useful vehicle in which other medicines may be administered for the cure of diarrhœa or colic.

MYRRH.—The tincture of myrrh is a useful application to wounds, and is also applied to the cankered mouth; but it contains nothing to render it preferable to the tincture of aloes in the former case, or a solution of alum in the latter.

NITRE—See POTASH.

NITROUS ETHER, SPIRIT OF.—A favourite medicine with may practitioners in the advanced stages of fever. It is said to rouse, to a certain degree, the exhausted powers of the animal, while it rarely brings back the dangerous febrile action that was subsiding. It is not, however, a stimulant to which the author has often dared to have recourse, except in the advanced stages of epidemic catarrh, or the malignant epidemic. The dose should not exceed half an ounce.

NUX VOMICA.—This is not introduced from any experience which the author has had of its efficacy, but from the favourable opinion which some continental veterinarians have expressed of it in the cure of palsy. The doses which they gave consisted of more than an ounce. The author has tried the nux vomica, and its essential principle, the strychnine, as a cure for palsy in the dog, but never with success.

Opium.—As an anti-spasmodic, an allayer of irritation, and an astringent because it does allay irritation, opium stands unrivalled. It is that on which the chief, or almost the only dependence is placed in locked jaw. A colic drink would lose the greater part of its efficacy without it; and if it were left out of the medicines for diarrhœa and dysentery, almost every other drug would be administered in vain. It is most conveniently given in the form of powder, and held in suspension with other medicines in thick gruel.

The tincture of opium (laudanum) is useful in inflammation of the eyes; and a poultice of linseed meal made with a decoction of poppy-heads often has an admirable effect when applied to irritable ulcers, or to parts labouring under much inflammation.

Pitch.—This is only useful as the principal ingredient in charges, so useful in cases of palsy, or sprain, or chronic local debility.

Potash, Nitrate of Nitre.—As useful to cattle as to the horse. It has an immediate effect in abating inflammation, and it is a mild diuretic. The dose would vary from two to four drachms. When dissolved in water it much lowers the temperature of that fluid, and therefore the solution, applied immediately after it is made, forms an excellent application in cases of sprains, or where there is much superficial inflammation without any lesion of the skin. Combined with antimonial powder, or emetic tartar and digitalis, it forms an almost indispensable ingredient in every fever drink.

Sulphate of Potash.—An ingredient in the Dover's powder.

Poultices.—These are justly valued for abating inflammation, cleansing wounds, and disposing them to heal. In some cases of foul in the foot, and especially in that most painful, and occasionally fatal variety whose immediate seat is at the division of the pasterns, also in ulcers about the throat or joints, and in garget, poultices can scarcely be dispensed with. The basis will generally be linseed meal, rendered even more soothing by opium; or to which activity may be given by the addition of common turpentine or chloride of lime.

Rye, Ergot of.—The spurred rye has lately, and with considerable advantage, been introduced into veterinary practice in protracted or difficult parturition, in order to stimulate the uterus to renewed and increased action, when the labour pains appeared to be subsiding. For the testimony in favour of and against the ergot, the reader is referred to p. 535 of this work.

Setons.—The use of setons in practice on the diseases of cattle is in a manner limited to the passing of a piece of hair, rope, or of black hellebore root through the dewlap; and, as exciting inflammation in the neighbourhood of the diseased part, and thus lessening the original one, and causing a determination of blood to a greater or less extent to this new seat of irritation, they are useful both in acute and chronic inflammation of the respiratory organs. In young cattle rapidly thriving, and placed in pasture perhaps a little too luxuriant, permanent setons are highly beneficial. They act as a salutary drain, and prevent that accumulation of the circulating fluid, which is the usual cause of inflammatory fever and other fatal complaints.

Sulphate of Soda, Glauber's Salt.—A very common purgative for cattle; and a very good one, but inconvenient on account of its requiring three times its weight of water in order to dissolve it, and also on account of its so readily efflorescing when it is exposed to the atmosphere, and, in its state of efflorescence or powder, becoming more purgative than when in its crystalline form. The practitioner sometimes finds it a little difficult to calculate the amount of the dose which he should give, on account of this variation in form and effect; and this may explain the occasional uncertainty of the Glauber's salt. The Epsom salt, a very little dearer, dissolving in its own weight of water, and retaining the same form and the same purgative power under every state of the atmosphere or of exposure to it, is now rapidly superseding the Glauber's.

Chloride of Sodium. Common Salt.—The experience of almost every farmer will now confirm the benefit derived from the mixture of salt with the food of cattle. It appears to be the natural and universal stimulus to the digestive organs of animated beings. In this place, however, its medicinal power alone is the subject of consideration. It is a purgative, second only to the Epsom salt in the first instance; and, whether from the effect of the change of medicine, or of some chemical composition or decomposition which takes place, it is the surest aperient that can be given when the Epsom salt has failed; but the writer does once more indignantly protest against the disgraceful, beastly menstruum in which it is frequently administered. It is a tonic as well as a purgative, and therefore perhaps somewhat objectionable in the early stage of fever. It frequently recalls the appetite more speedily than any stomachic. When a dose of it is given to the animal recovering from acute disease, debilitated, listless, careless about or refusing its food, it sometimes has an almost magical effect in creating a disposition to feed. It is a vermifuge which, in cattle, seldom fails.

Silver, Nitrate of. Lunar Caustic.—Used for the destruction of warts either in its solid state, or that of a strong solution; and, from the full command which the operator has over it, and the firm eschar which it forms, is the very best caustic that can be applied to a wound inflicted by the bite of a rabid dog.

Sulphur.—A very good aperient when the object is merely to evacuate the bowels, or when there is any cutaneous affection; but not sufficiently powerful in cases of fever: yet even there purgation, once established, may be kept up by means of it. The dose varies from eight to twelve ounces. As an alterative for hide-bound, mange, or generally unthrifty appearance, it is excellent combined with Æthiop's mineral and nitre; and it constitutes the basis of every ointment for the cure of mange.

Tonics.—These are indicated in cases of great, and especially of chronic debility, but, administered injudiciously, they have destroyed thousands of beasts. They have done so when they have been poured in while the fever continued, or too soon after the subsidence of the fever, and when too great a disposition to its reappearance prevailed. When disease has been once removed, the powers of nature are usually sufficient to re-establish health. Gentian, calombo, and cascarilla, are the best, and almost the only safe tonics for cattle.

Turmeric, or coloured pea-flour, for it is seldom any thing more, is fit only to give that yellow colour to cattle-medicines, which long usage has accustomed the cow-herd and the cow-leech to consider as indispensable.

Turpentine.—Several of the products of the fir tree are more or less useful in the medical treatment of cattle.

Tar, spread upon coarse cloth, is the best covering for broken horns, and excludes both the fly and the atmospheric air. It is useful for the same purpose in cases of wounds puncturing the belly or chest. Alone, or in combination with some greasy matter, is used to defend sore or diseased feet from becoming wet or bruised.

PITCH is the principal ingredient in charges.

COMMON LIQUID TURPENTINE is useful as a *digestive*, or to produce a healthy appearance or action in wounds, and dispose them to heal. For this purpose it is added to the linseed poultice or to the simple ointment. Some practitioners administer it as a diuretic, and with good effect.

OIL, or SPIRIT OF TURPENTINE, is applied as an external irritant, either alone, or in the form of a tincture of cantharides. It is administered internally in colic; and some give it in red-water with a view to cause the debilitated blood-vessels to contract, and thus arrest the passive hemorrhage which they imagine is then taking place. From the rapidity and great extent with which it is taken up by the absorbents, and carried into the circulation, and the destructive effect which it is known to have on intestinal worms when otherwise brought into contact with them, the trial of its power would be justified in bronchitis, the too frequent and fatal concomitant of which is the presence of thousands of worms in the air-passages.

RESIN is often used to give consistence to plasters, where the degree of irritation which it might produce is not regarded, or would be beneficial.

VINEGAR.—This used to be considered almost a specific in distention of the rumen with gas, but on what principle it would be difficult to explain. It has also been given with manifest impropriety in cases of fever. On the thick skin of the ox it can have little preference to hot water as a fomentation, and may with no great loss be erased from the list of medicines.

WAX.—Its only use is to give consistence to ointments and plasters.

ZINC. NATIVE CARBONATE OF CALAMINE.—This is the basis of an ointment which, from its soothing, and, at the same time, drying qualities, is termed, in various parts of this work, 'the healing ointment.' It is useful in superficial wounds, and in deeper ones when they have been brought to a healthy character.

WHITE VITRIOL.—This is a useful tonic application to the eyes, when the inflammation has been subdued, and debility of the vessels alone remains. It is particularly useful after inflammation of the haw of the eye. Some administer it in red-water, and others in dysentery, very improperly. As a general canstic it is superseded by many others.

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